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# VENEREAL DISEASES

THEIR

## COMPLICATIONS AND SEQUELÆ

BY

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Late Professor of Dermatology and Genito-Urinary Surgery in the Bellevue Hospital Medical College; Consulting Surgeon to Bellevue Hospital, etc., etc.

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ILLUSTRATED BY EIGHT FULL-PAGE PLATES IN BLACK AND COLORS AND ONE HUNDRED AND SEVEN ENGRAVINGS

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# PREFACE.

A FORMER work of identical title, from the pen of the senior author of this volume, appeared in January, 1880, twenty years ago, as one of "Wood's Library." It had two objects in view, both of which have been accomplished.

The first object was to combat the then raging furor for anterior urethrotomy which possessed the younger members of the profession. This is now happily over, and a certain amount of good has followed the excess. Strictures of the pendulous urethra are understood and managed better to-day than twenty years ago.

The second and most important object was to disseminate the author's teachings upon the treatment of syphilis. This tonic treatment, by the prolonged mild use of mercury in such a way as to do the patient no harm while his malady was being mastered, is to-day so widely spread and so well understood, and has been accepted so largely, if judgment be rendered according to the evidence at command, that there is no reason to make any radical change, in so far as syphilis is concerned, in the presentation of this subject.

But that book has long since ceased to be a safe guide in its urethral teachings on account of the strides made in bacteriology and therapeutics during the last decade.

The younger blood of the junior author and his point of view, together with a general growing experience, have revolutionized many of the ideas advanced in the former treatise, and the time has seemed ripe to us to join hands in authorship for the purpose of placing the result of our combined experience before the profession in a practical way.

This volume is the result.

In it is reproduced the senior author's original teaching concerning chancroid and syphilis, the latter practically in the whole piece making little change further than to cut out references and cases to reduce the volume of the text, but the chapter on chancroid has been reconstructed.

A valuable chapter on nervous syphilis has been contributed by Dr. Pearce Bailey, consulting neurologist at St. Luke's Hospital, and to him the authors render public acknowledgment. Dr. Chetwood, the junior author, has so entirely remodelled and rewritten that portion of the book

relating to the urethra that it has seemed proper to place this section first and to issue the volume as a new book rather than under the name of a second edition of the old book.

The authors' warm thanks are extended to Dr. F. M. Jeffries, director of the laboratory of the New York Polyclinic College and Hospital, for excellent work in collecting references and assisting in preparing the section on the Bacteriology of Urethritis. To Dr. A. F. Büchler we are indebted for clinical material, and to Dr. D. A. Sinclair for various good offices.

E. L. Keyes.
C. H. Chetwood.

109 East Thirty-Fourth Street,
New York, January, 1900.

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# INTRODUCTION.

A STRICT application of the title of this treatise should include only those diseases acquired during sexual intercourse and starting in the sexual organs. But these maladies may by direct contagion make their initial appearance elsewhere, and through their complications and sequelæ invade the adjacent organs or involve remote parts of the body.

Of the three principal divisions of venereal disease—syphilis, chancroid, and gonorrhœa—the first two commonly appear upon the external genitals, while the last is essentially a disease of the urethra, and is, on account of its microbic origin, otherwise known as specific urethritis.

Each of these maladies is distinct from the other etiologically, pathologically, and clinically. All of them are virulent and contagious, and while they never arise *de novo*, yet in the case of chancroid and gonorrhœa there exist spurious examples which bear so close a resemblance to the real malady that the difference is only bacterial, and the selection of treatment must depend upon a knowledge of this fact. These spurious cases are of idiopathic origin and may be non-venereal in their nature, but as they are frequently acquired during the sexual act and so closely resemble their prototypes as often to be mistaken for them, their consideration becomes a necessity in a work upon venereal diseases. The same remark applies also to the complications and sequelæ of the venereal diseases. These latter are not confined to the genital regions, but include, through contiguity, the neighboring organs and, by reinoculation and metastases, remote parts of the body.

Finally, syphilis is not a disease of any organ or of any region, but of every tissue in the body and of the blood as well. Hence the title venereal refers only to the source from which these several maladies and their complications are derived and to the customary location of the primary lesions occasioning them; but as the name is sanctioned by time and custom it must be retained, although entirely too narrow to indicate the scope of a treatise which a proper consideration of the group of maladies involved necessarily calls for.

# PART I.

## ACUTE AND CHRONIC URETHRITIS.

### COMPLICATIONS AND SEQUELÆ.

# VENEREAL DISEASES.

## CHAPTER I.

### SPECIFIC AND NON-SPECIFIC URETHRITIS—GONORRHŒA.

#### Definition and Etiology.

The term urethritis, without qualification, signifies inflammation of any portion of the urethral canal. Such inflammation is designated, according to its cause, specific or non-specific; according to its locality, anterior or posterior; and, according to its duration, acute or chronic.

*Specific urethritis*, commonly spoken of as *gonorrhœa*, is, in the male, an intense urethral inflammation, characterized by a period of incubation, and by a profuse discharge of pus which possesses virulent qualities, due to the presence of a diplococcus—the gonococcus of Neisser.

This definition at once places gonorrhœa in the rank of virulent diseases. It has a period of incubation, runs a course of varied length, possesses its virulence to the very end, and is in the highest degree contagious.

*Non-specific urethritis*, as its name implies, differs from gonorrhœa in that it is not referable to a single cause. It is etiologically complex. Its causes arise from without and from within the urethra. Generally speaking, it comprises those cases of urethral inflammation not directly traceable to the gonococcus. It may resemble gonorrhœa so closely in all its symptoms that, *clinically*, a diagnosis between them often cannot by any possibility be made. This, however, is simply due to the fact that the symptoms of inflammation of the urethra, when they run high, are alike, whether their cause be specific or non-specific. Theoretically, a distinction must be recognized between non-specific urethritis and gonorrhœa, although practically such a difference oftentimes cannot be demonstrated except by resort to the microscope. Clinically the symptoms of non-specific inflammation of the urethra have to be treated symptomatically in accordance with the grade of their intensity; whereas gonorrhœa is treated with special regard for its specific cause.

The intensely contagious quality of gonorrhœal pus has been too long and too well known to require more than a mention. It has been demonstrated by direct experiment from urethra to urethra long before the dis-

covery of the gonococcus. It was demonstrated with equal certainty by oculists, by inoculation of the conjunctiva for clinical purposes. In the course of nature it is demonstrated upon the victim who has exposed himself to it in sexual intercourse; and the eyes of a patient with gonorrhœa may also attest the powerful contagiousness of this disease.

No one can possibly dispute the fact that, if pus taken from a case of *true* gonorrhœa be placed upon the orifice of the urethra of the male, or the vagina of the female, an inflammatory disturbance of considerable intensity will be lighted up. But it was not until the discovery of the gonococcus by Neisser and its cultivation and reinoculation upon the human urethra by Bumm that the true etiological factor of this disease was disclosed.

On the other hand, it is known that pus of the most varied character, not gonorrhœal, but containing various forms of bacteria may be placed upon the meatus of the male urethra, or poured along its course, without inflaming the canal. In cases of intense balanitis beneath a very tight prepuce, the cavity of the foreskin is constantly filled with dense creamy pus; yet in such a case, if the foreskin be slit up, it is often found that the glans penis is excoriated in patches, and the meatus of the urethra raw perhaps, but no urethritis exists. Pus from pyelitis may be voided as thick as cream through the urethra, but it does not occasion inflammation of the canal.

In the female, pus from the kidney or bladder, passing through the urethra, or pus in vast quantities coming from the uterus, may exert little more than a mild amount of mechanical irritation upon the parts over which it passes.

Finally, the male often cohabits with a female whose vagina contains more or less pus from the uterus, and remains well; while in many cases a man with a more or less purulent discharge may lie with a woman, and she will remain sound. Not so in either case, however, if there be present the microbic poison of gonorrhœa. A gleet after gonorrhœa which is nearly well may give a gonorrhœa to a woman if the gonococcus be still present, as will a mild lurking inflammation in the vagina readily poison the male when its secretion harbors the presence of this specific organism.

A large percentage of men in cities have a small amount of gleet from one cause or another; yet gonorrhœa in the females (their wives), with whom they cohabit, is not common—it is, indeed, exceptional. In France a gleet is considered a natural thing with a soldier, so much so that it is called the "military drop"; but the women with whom they live are not necessarily affected with an analogous disorder. Indeed, there are certain forms of urethral discharge, which, the gonococcus having been carefully excluded, may call for the married state for their cure, and which get well during regular sexual hygiene, without involving the wife in any disorder.

As to the power of pus in the vagina to give gonorrhœa to the male. Doubtless the male often gets his urethritis from contact with such irritating discharges, but he does not *necessarily* become irritated by them at all. Indeed, he usually escapes, unless his own urethra has been damaged by previous gonorrhœa, and he happens to be himself either debilitated, overtired, or full of liquor, or suffering coincidently from very acid urine, or unless he overstimulates himself sexually. All of these causes are capable alone of producing urethritis when the mucous membrane is in a morbid or congested condition, but are more apt to be predisposing in their nature, and the means of inducing acute inflammation, through the activity of the various micro-organisms which commonly infest the urethra and vagina, and which, although not necessarily pathogenic, may become so under certain conditions.

When a patient, however, offers himself, in sexual exposure, to the diplococcus of true gonorrhœa, he is almost certain to become poisoned without the co-operation of any of the adjuvants mentioned above. A simple exposure is enough.

The theoretical distinction, therefore, between gonorrhœa and urethritis is clear; the clinical distinction is often equally so. Yet, without doubt, an intense urethritis is one and the same in its symptoms, whether its cause be the gonorrhœal virus or any other microbic agent internal or external.

From what has been written, it may be inferred that the causes of urethral inflammation are quite varied. The cause of true virulent gonorrhœa is single, namely, contact of the affected person with gonorrhœal pus from another person. Urethritis, however, may be produced in a variety of ways almost infinite, and it cannot be distinguished in its symptoms, when intense, from a gonorrhœa. This fact cannot be too often repeated. That surgeon is bold indeed, who, in the face of a certain urethral discharge of given intensity, without the use of the microscope will pronounce upon its origin with any confidence, and some writers on account of the close resemblance in every particular of other micro-organisms to the gonococcus by microscopic examination, deem it necessary to resort to further bacteriological technique with the purpose of obtaining a pure culture in a suitable medium, before the question of its presence in a given discharge can be satisfactorily passed upon (see Bacteriology of Urethritis). No one can be accused of impure relations because he has a profuse urethral discharge. It cannot even be said that such a person has had sexual intercourse at all; for it is possible for a man, virgin of all venery, to have an intense urethral inflammation, and much injustice may be done by accusing him, on the one hand, or, on the other, of accusing his partner—if he has had one—of having given him a disease.

The moral is, that the physician is not a judge. His function, if he

has any of the judicial sort, is to shield the innocent. He should accuse no one, but confine himself to his own proper duties.

If the urethra be healthy, it does not easily become inflamed, excepting by contact with gonorrhœal pus. Yet a healthy urethra does sometimes suppurate after mechanical violence, such as the rough introduction of instruments through it; after chemical violence—the injection of irritating substances for experiment, or under the idea of employing a prophylactic against supposed infection. Under these circumstances the micro-organisms which are latent in the urethra exert a more or less virulent action against it as a result of the traumatism induced. A healthy urethra may also become inflamed by the combined influence of venereal excitement—especially if intense or prolonged—and contact of an irritating discharge, leucorrhœal pus, menstrual blood, etc. Here the virulent factor is derived from without.

An unhealthy urethra is always ripe and ready for inflammation. In strumous, strongly lymphatic, gouty, and rheumatic subjects, the urethra seems prone to take on inflammation easily, especially if the person be cachectic, overworked, or reduced in general health from any cause. In such cases all the mucous membranes are apt to be in an irritable condition, and to take on subacute inflammation from trivial causes.

When the urethra is actually diseased, on account of the previous existence in it of acute inflammation—when it contains a thickened, hyperæmic patch, constituting a slight stricture—then it is in a prime condition to be irritated into suppuration—often a suppuration of formidable proportions—by the action of those micro-organisms which, in the healthy urethra, fail to produce any apparent irritation. This is especially true when the urethra, besides being the seat of a chronic patch of congestion left behind by an old gonorrhœa, is, at the same time, diathetically unhealthy, owing to the broken health, the bad hygienic surroundings, the cachectic condition, the nervous prostration, or the scrofulous or gouty constitution of the patient.

When the mucous membrane of the urethra is unhealthy, the introduction of a sound will sometimes produce quite a sharp attack of urethritis. The passage of very acid urine through the canal may bring about the same result, whether the uric-acid crystals be due to indigestion, an attack of gout, or over-stimulation by alcohol (particularly beer or champagne). Mere excess of sexual excitement will sometimes produce a flow of pus, and prolonged sexual intercourse may do the same, particularly if there be any purulent discharge in the vagina. In early married life the male is not unlikely to get a little urethritis from his wife; but after his approaches become less amorous, he has no further trouble.

In connection with many morbid states of the prostate (cancerous, tuberculous, inflammatory) and of the urethra (herpetic, chancrous—

tuberculous, syphilitic) a more or less purulent flow from the urethra may be encountered, and a purulent discharge attendant upon organic stricture is of every-day occurrence.

### Bacteriology of Urethritis.

The various micro-organisms which normally inhabit the anterior urethra have been isolated and studied by different observers, notably Lustgarten and Mannaberg, Steinschneider, Pettit, and Wassermann. The writings of these and other authorities furnish us with a knowledge of the bacterial flora of the normal urethra. An enumeration of the different forms would occupy unnecessary space. It is sufficient to state that these comprise bacilli of varying lengths and contour; cocci variously grouped; diplococci, round, oval, and hemispherical; streptococci, small and large; staphylococci, round and oval and of different sizes. Therefore when the gonococcus is implanted upon the urethra it is not inoculated upon a sterile territory, but one where already thrive myriads of different micro-organisms. How these latter modify the action of the gonococcus is hardly known, or what part they play in limiting its career in the urethra. That their presence is harmless in the quiescent state is beyond dispute, but that they assume under certain conditions very virulent properties seems to be proven in those forms of urethritis which come under the title of non-specific inflammation.

It is now generally accepted that the gonococcus is the microbic agent of true gonorrhœa. It is also known that there exists a close analogy between some of the other diplococci and the specific organism of true gonorrhœa (the gonococcus of Neisser). In fact it is maintained by some that the so-called pseudo-gonococcus and the gonococcus of Neisser are indistinguishable in some instances, in which the former partakes of the characteristics of the latter without variation. Improvement in bacteriological technique, however, and the discovery of a reliable culture medium for the gonococcus make its differentiation a practical certainty, as it has been possible to reinoculate upon the human subject from a pure culture and demonstrate conclusively the specific action of the gonorrhœal organism. When the evidence furnished by means of the microscope and cover-glass preparations is negative, resort may be had to cultivation on a proper medium when absolute certainty of diagnosis is required. The advantage of cultivation is mainly in those cases in which a few shreds or filaments are present in the urine and nothing more, and in the case of patients who suffer from a very mild catarrhal gleet and who contemplate matrimony. In either of this class of cases a positive diagnosis may be desired, but the gonococci, if present at all, are so scarce that the microscope may fail to find them until their number is greatly augmented by propagation upon a suitable medium. But when there are present in

a given discharge suspicious organisms, which can be seen with the microscope to resemble the gonococcus, differentiation can be satisfactorily made without cultivation, by means of the Gram method of staining (Plates III.–VII.).

In cases of non-specific urethritis and pseudo-gonorrhœal inflammation examination of the discharge reveals the presence of different kinds of bacteria, such forms as cocci and bacilli, which are known to be present in normal vaginal and urethral secretions. That these organisms enter somewhat into the causative agency of non-specific inflammation there is no doubt, but in this particular they differ materially from the gonococcus, that their separation in pure culture and reinoculation do not result in the production of a similar inflammation, and therefore they may be said to be only one of the factors which enter into the causation of non-specific urethritis.

Bockhart,[1] in examining cases of catarrhal urethritis, found present in large numbers specimens of bacteria which inhabit the normal vaginal secretion. Bacilli were found only in small numbers. As the process of inflammation advanced, the number of organisms diminished so that finally one form only remained—a micrococcus. He found a coccus like the staphylococcus grouped as diplococci. These were smaller than the gonococci, the segments being hardly as large as the erysipelas cocci. No concavity in the segment was observed. They were isolated or in clusters of great colonies. They were found within epithelial cells as well as within the protoplasm of the pus cells.

Krause and Hirschberg, in examining several hundred ocular secretions, frequently found micro-organisms closely resembling the gonococcus Neisser, which were hard to differentiate from the latter.

Elkhund found a similar form of diplococcus in the secretions of acute and chronic suppurative processes of the lungs and intestines and in ulcerous stomatitis.

Bumm with Bockhart discovered organisms closely resembling the gonococcus in the genital tract of women. The former observer in extensive investigations has made a study of the various organisms which closely resemble the gonococcus in the minutest detail. Some of these are pathogenic and others not. He enumerates several of the spurious forms and gives their bacteriological characteristics. The principal ones are: 1. A lemon-yellow diplococcus, non-pathogenic, found in the dust of the air, also in purulent secretions of the urethra and conjunctiva. 2. A milk-white diplococcus, non-pathogenic, found in the preputial smegma and in various secretions of the body and in ulcerous processes of the vagina and mouth. 3. A yellowish-white diplococcus, pathogenic, found in the lochial discharges, in the catarrhal urine of women after childbirth, also in mammary abscesses. 4. A gray-white diplococcus, non-pathogenic,

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[1] Monatschrift für Derm., 1886, p. 134.

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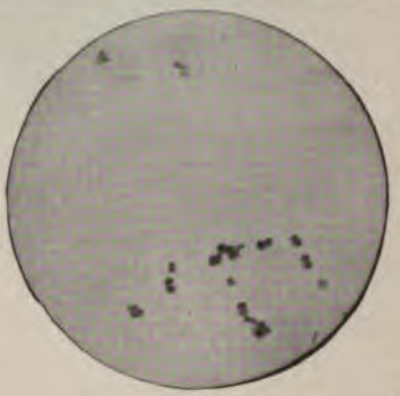

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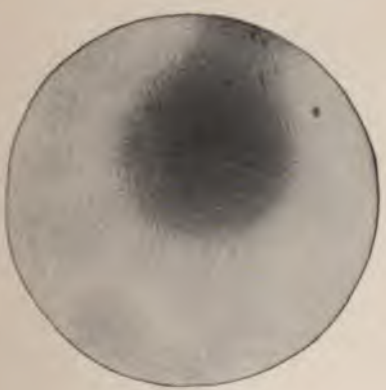

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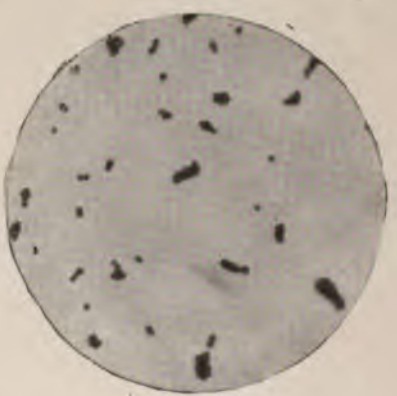

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1. Colony on nutrient agar of large diplococcus from normal urethra. Magnified.
2. Microscopical examination of same organism. 1,000 diameters.
3. Pure culture on acid gelatin of Turro's diplococcus urethræ. 1,000 diameters.
4. Colony on nutrient agar plate of diplococcus found in catarrhal colpitis. Magnified.
5. Microscopical examination of same organism. 1,000 diameters.

CULTURES OF DIPLOCOCCI SOMETIMES MISTAKEN FOR THE GONOCOCCUS. (HEIMAN.)

found in vaginal secretions. 5. A red diplococcus found in the dust of the air, non-pathogenic. Most of the above organisms are found to be readily cultivated at ordinary temperatures.

It seems possible to cultivate them on gelatin and other ordinary media without difficulty, differentiating them from the gonococcus, which is difficult to cultivate and requires a special medium (Plates I. and II.).

Neisser[1] declares that urethritis can be caused by other bacteria than the gonococcus. He mentions a case in which no gonococci were found, but a large number of intra- and intercellular "bacilli diplococci" ("Stäbchen diplococci") were present.

**The Gonococcus.**—The gonococcus was discovered by Neisser in 1879 in gonorrhœal pus, and was first cultivated by Bumm in 1895. These organisms consist morphologically of micrococci, usually joined in pairs (diplococci) or in groups of four. The separate elements are flattened or hemispherical with the flattened surfaces approximated, and in the stained preparation presenting an unstained interspace. The approximated faces sometimes present a slight concavity. Their average size is 1.25 $\mu$ in the long diameter. Their multiplication occurs by fission, alternately in two planes, as a result of which groups of four are frequently observed. The diplococci are more frequent. Single spherical individual cells are rarely seen. The microscopical appearances are not entirely characteristic of the gonococcus, as various other diplococci cannot be distinguished morphologically from the gonococcus. It readily stains with the basic aniline colors, especially with methyl violet, gentian violet, and fuchsin. It is negative to Gram's stain—that is to say, it is decolorized by the iodine solution used in this method. It has been stated that this characteristic does not serve to differentiate it, as other diplococci have been found in gonorrhœal pus which react in the same way (Bumm); but it is held on equally good authority that the characteristic action of the Gram method upon the gonococcus is the best and most reliable means of establishing its identity, and that when confounded with other diplococci the error is due to faulty technique. In our judgment there is no better means than the Gram test for recognizing the gonococcus, but the greatest pains must be taken in every detail to make this test conclusive.

Another distinguishing characteristic but of lesser diagnostic value is the fact that the diplococcus gonorrhœæ is found within the protoplasm of the pus cells. It is found also within the epithelial cells. Pus cells are observed entirely filled with these organisms. Bumm describes what he considers the one exception in a diplococcus found within pus cells from a case of puerperal cystitis. These cocci retained their color after being treated by the Gram method of staining.

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[1] Deutsche med. Wochenschrift, 1893.

To fix the identification, then, of the gonococcus there should be diplococci of the right form, size, and arrangement. They must be negative to Gram staining, and should be observed within the protoplasm of the pus cells. The method of establishing the identity of the gonococcus by more elaborate bacteriological technique—namely, its cultivation upon a proper medium, also demands recourse to the Gram staining as a final means of identification.

The gonococcus does not grow upon the ordinary cultivating media. It thrives best at the body temperature. The extreme degrees of temperature in which it grows are between 25° and 39° C.

Various special media have been used successfully in the cultivation of this organism. Hammer[1] describes a mixture of albuminous urine containing 1 to 1.5 per cent albumin with glycerin agar. The two constituents are separately sterilized and then mixed. Upon this medium the author obtained rich growths of the organism.

Bumm first succeeded in cultivating the gonococcus upon human blood serum prepared from the placenta of a recently delivered woman. The other media used successfully have been prepared by mixing two parts of glycerin agar with one part of fluids rich in albumin, such as ascitic fluid, fluid from hydrothorax, hydrocele, or ovarian cysts. A more simple plan is the use of the ordinary nutrient agar, the surface of which has been richly spread with human blood. The blood may be obtained directly from a small cut.[2]

The gonococcus is a facultative anaerobe. Cultures upon the surface of blood serum are thin and scarcely visible. The surface is smooth, moist, and shining, yellow by reflected light; the edges of colonies are finely serrated. The growth spreads but slightly and does not continue more than two or three days, as the cocci lose their vitality. It is a strict parasite. (Sternberg.)

Unless dried out, the gonococci may retain their vitality upon serum agar at the body temperature for four weeks. If dried they lose their vitality within a few hours.[3]

The gonococcus has never been found outside of the body as a harmless saprophyte. According to Heiman[4] the gonococcus remaining in the urethra after a gonorrhœa may lie dormant there and remain innocuous for years, and yet at any time excite an acute gonorrhœa in another person; but this same author believes[5] that the statements of Strauss, Pescioni, and Eraud, that the gonococcus occurs *as a denizen of* the normal urethra, are not satisfactorily proven by their published experiments.

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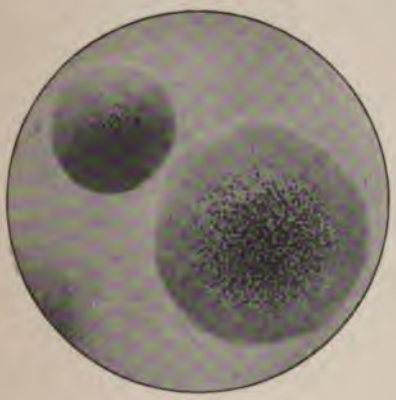
[1] Deutsche med. Woch., 1895, p. 60.

[2] Abel: Deutsche med. Woch., 1893, p. 265. Fischer: Berliner klin. Woch., 1895, p. 1156.

[3] Lehmann: "Bak. Diag.," 1896, p. 151.

[4] Medical Record, December 19, 1896. [5] *Ibid.*



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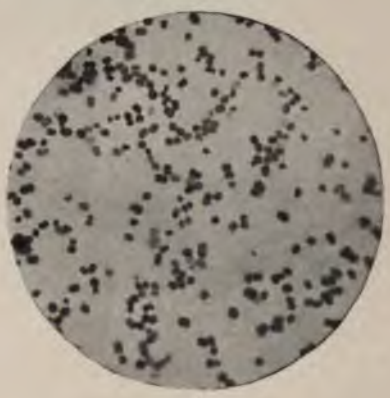

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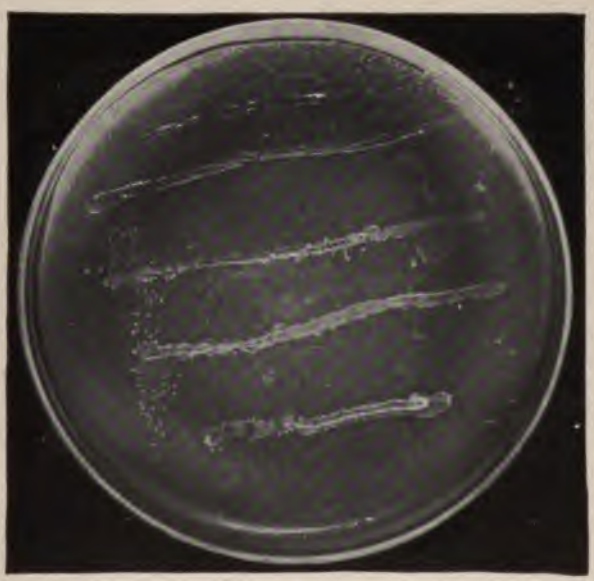


3

1. Colony on chest-serum agar of gonococci from male urethra. Magnified.
2. Microscopical examination of a pure culture. 1,000 diameters.
3. Gonorrhœal pus sown on chest-serum agar, showing a pure gonococcus culture.

CULTURES OF THE GONOCOCCUS. (HEIMAN.)

The various localities in which the gonococcus has been found comprise the urethra and prostate of man, the urethra, Bartholin's glands, and the cervix uteri of women. It has been found as the cause of vaginitis and urethritis of young girls. It has been discovered in endometritis, urethritis, salpingitis, oöphoritis, peritonitis, proctitis; probably also in epididymitis and cystitis; also in blennorrhœa neonatorum, conjunctivitis, rhinitis, otitis, and arthritis. It is still uncertain whether it occurs as the cause of pleuritis and malignant endocarditis.

Flattened epithelial cells seem to serve as a better protection against infection than do columnar epithelia.

This parasite has been observed to have penetrated the epithelium, and to have reached the connective tissue beneath.

Immunity does not follow infection.

Attempts to inoculate the lower animals are not successful and do not produce the true gonococcus of Neisser, but may yield a spurious organism, somewhat resembling it morphologically, but which can be differentiated from it by means of the Gram test properly conducted.

In order to demonstrate the presence of the gonococcus in cover-glass preparations we believe that the method of Gram should be relied upon entirely, and therefore a clear understanding of the various steps included in this staining method and differential test is absolutely necessary to success.

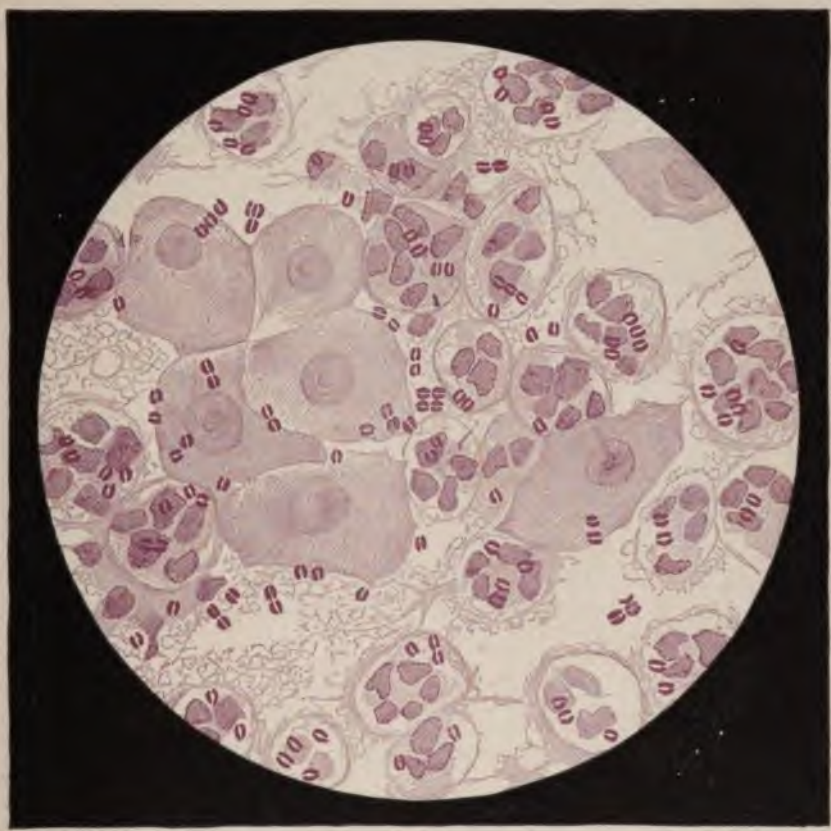
In a valuable communication of his work in the library of the Paris Necker Hospital Dr. M. Weinrich, of Berlin,[1] lays great stress upon what he considers the most fruitful source of error in the conduct of this test, namely, the use of water for washing purposes in any of the steps. He believes that by so doing complete decoloration of the gonococcus, when washed in alcohol, is interfered with.

What is known as Gram's solution consists of the following combination: Iodine 1 part, iodide of potassium 2 parts, water 300 parts. This preparation is used in bacteriological technique for demonstrating the presence of various bacteria. The specimen is previously stained for one or two minutes by a solution of gentian or methyl violet, when it is treated by the Gram solution for the same length of time. This solution in the presence of the aniline dye forms an insoluble deposit which is confined to the bacteria, and which in the case of most bacteria is not dissolved out when treated with absolute alcohol until the specimen appears colorless to the naked eye. In treating the gonococcus of Neisser, however, in the same manner as above, it was discovered that the Gram stain is dissolved out of these organisms by the alcohol, while it remains fixed in any other organisms which may be present in the same field. Thus it may be seen that we have here a most valuable differential test for the

[1] Annal. des Malad. des Organ. Genito-Urin., May, 1898.

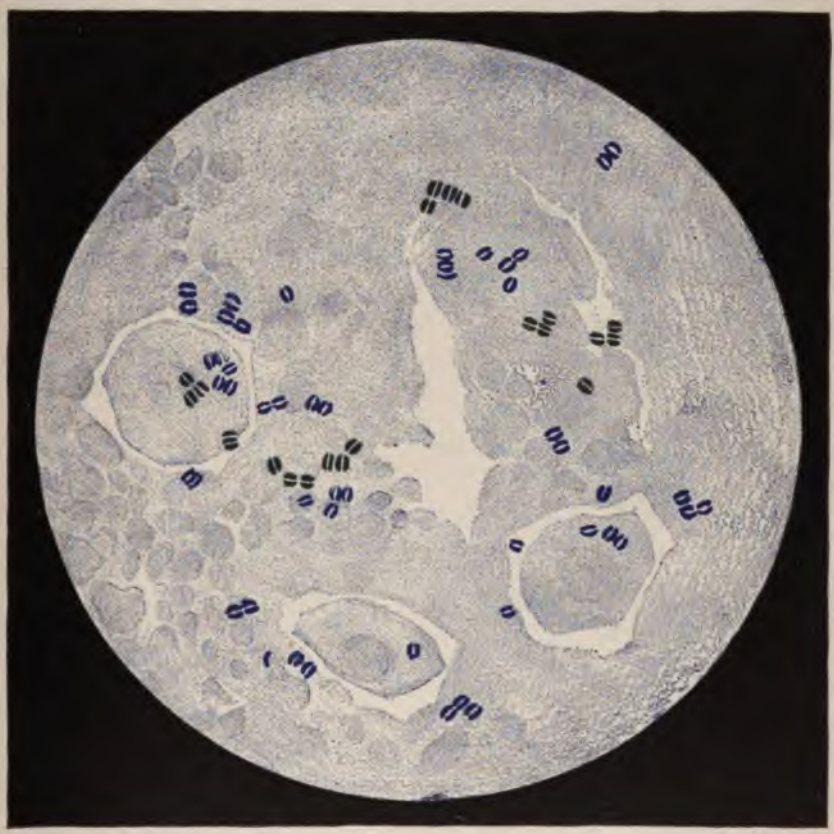
gonococcus. As a final means of detecting gonococci, after they have been subjected to the various steps of the Gram process, it is necessary to submit them to a restaining by another aniline dye, preferably one which is markedly different in color from the original stain used in the Gram test. In the final microscopic examination of the dischargefrom a case of gonorrhœa we have in the field a number of organisms which are not gonococci colored by the Gram stain, and in contrast to these the gonococci with the color of the second dye or counter-stain (Plates VI. and VII.).

Thin smears of pus are first prepared on cover glasses and allowed to dry in the air spontaneously, or artificially by means of very gentle heat. The smear is then "fixed" by passing the cover glass three times through the flame of an alcohol lamp or Bunsen burner. The first step in the Gram method is to stain the smear with a solution of aniline dye. One of the best is that known as Ehrlich's solution, composed of a saturated alcoholic solution of gentian violet, 10 parts, in 90 parts of aniline water (Hogge). Aniline water is prepared by emulsifying 1 part of aniline oil in 20 parts of distilled water by shaking in a test tube. Allow the emulsion to stand a moment and filter through a wet filter until the filtrate is perfectly clear. Now cover the smear with the above aniline gentian-violet solution, and allow it to stain for one or two minutes. *Do not wash with water*, but remove the surplus dye by means of filter paper and transfer immediately to the Gram solution, where it should also remain for one or two minutes. Next, again without washing with water, immerse in absolute alcohol until the color disappears and the preparation is perfectly clear to the naked eye. This should take from one minute to two minutes when the previous steps have been properly conducted. If water be used between the stages, or if the alcohol be not absolute, the process of decoloration will take much longer and the ultimate result may be unsuccessful. After this stage of decoloration by means of the absolute alcohol the gonococci will have lost their stain, while many other forms of cocci, such as staphylococci, which may be present in the pus, will still retain the dye (Plate V.). It now becomes necessary to counterstain the gonoccocci with some other color, and for this purpose we employ either Bismarck brown or Victoria blue. The Bismarck brown is prepared by adding 3 parts of the brown to 70 parts of distilled water and 30 parts of alcohol. The Victoria blue solution is made by adding 1 part of the saturated alcoholic solution of this dye to 100 parts of water. The smear is treated with one of the above solutions for about three minutes, after which it may be washed with water. The specimen may also be washed with water after it has been decolorized with alcohol and before the counter-stain is used, the Gram process being then complete. Finally the preparation is dried, mounted in Canada balsam upon a slide with the smear turned downward, and examined with a $\frac{1}{12}$-inch oil-immersion objective (Plates VI. and VII.).

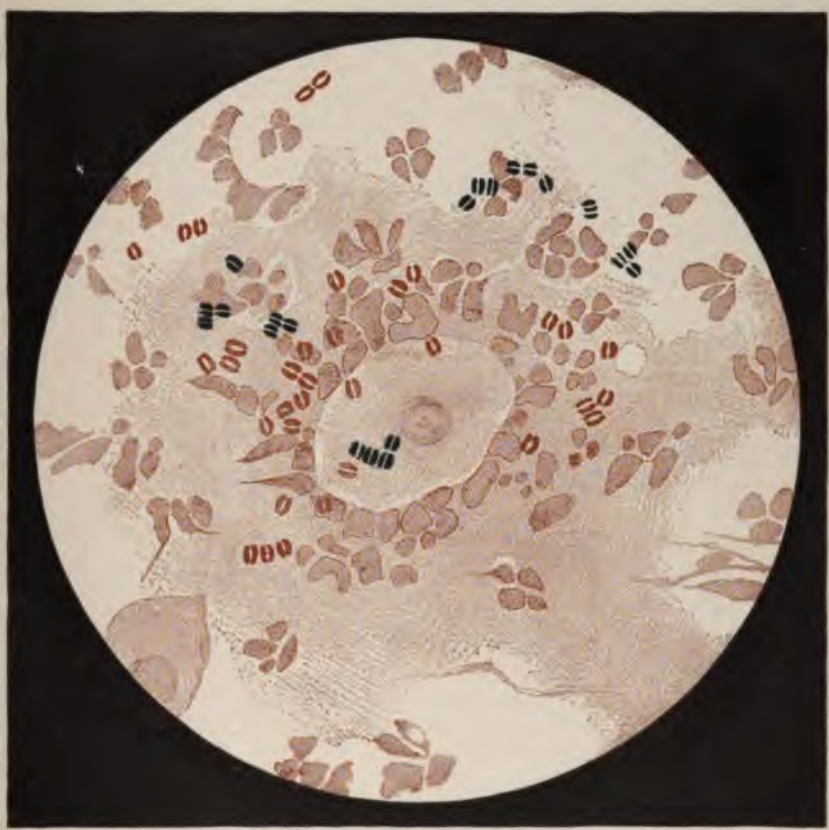


Specimen taken from case of Gonorrhœal Urethritis, stained with gentian violet solution. Here the gonococci and pseudo-gonococci are stained alike and cannot be clearly differentiated. 2,000 diameters.

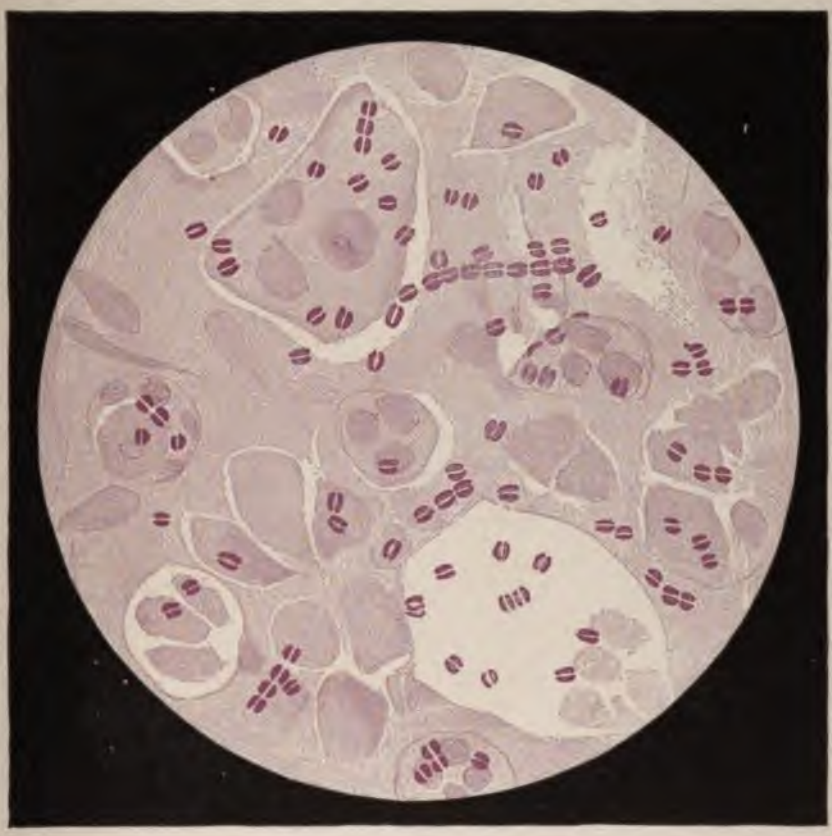
Specimen from same case of Gonorrhœal Urethritis as Plate III., treated by the Gram method, but before restaining. Here the gonococci which do not take the Gram stain are decolorized by the absolute alcohol, while the pseudo-forms, in marked contrast, retain the Gram color. 2,000 diameters.



Specimen from same case of Gonorrhœal Urethritis as Plate III., treated by the Gram method, and restained with Victoria blue. Here the gonococci take the color of the secondary stain, while the pseudo-forms retain the Gram color. 2,000 diameters.



Specimen from the same case and treated in the same manner as Plate V., but restained with Bismarck brown. 2,000 diameters.



Specimen from case of Non-Specific Urethritis, showing pseudo-gonococci stained with gentian violet. 2,000 diameters.

Fraenkel, of Hamburg,[1] has suggested the substitution of carbolated for aniline water in the preparation of Ehrlich's solution and in the same proportion, that is to say, 10 parts of saturated alcoholic solution of gentian violet to 90 parts of two-per-cent carbolated water, and this author has found that the above solution resists decomposition for a much longer period than the aniline-water preparation, and on this account it is certainly to be recommended as a desirable substitute, for any decomposition in the aniline gentian-violet solution is liable to lead to errors in the microscopical examination, in view of which possibility it has been recommended that the aniline solution be made fresh before each examination. By using the carbolated solution this precaution becomes unnecessary.

To recapitulate, the steps in staining cover-glass preparations in examining for the gonococcus are: First spread a very fine film of discharge upon a cover glass. Allow this to dry spontaneously or by gentle heat. "Fix" by passing the cover glass three times through the flame of an alcohol or Bunsen burner. Stain with gentian-violet solution, preferably that made with carbolated water, for a period of one or two minutes. Remove the surplus solution with filter paper, but do not wash with water. Next immerse in the Gram solution for a similar period. Decolorize with absolute alcohol until the specimen is clear to the naked eye. This should take about one minute and a half. Now wash in water [the Gram test being completed] to remove the alcohol and restain with a solution of Bismarck brown or Victoria blue. Wash again in water, dry the cover glass, and mount with Canada balsam. Examine with $\frac{1}{12}$-inch oil-immersion objective.

In keeping with the careful observations of Nogues, Weinrich, and others, we must emphasize the most important precaution in the conduct of this process to insure a successful result—namely, the use of absolute alcohol for the purpose of decoloration and the avoidance of the use of water between the various steps, until after decolorization shall have been effected.

## Symptoms of Urethritis.

In studying the symptoms of inflammation of the urethra, it will be convenient and practical to make two classes of cases, according to the intensity of the inflammation, and briefly to review the symptoms in each.

**Symptoms of Simple Non-Specific Urethritis.**—This is by far the commonest form of urethritis. This is likely to be the form which those have who boast of a dozen or more attacks of gonorrhœa, and of those individuals who claim they get the gonorrhœa constantly, but do not mind it, as they have a little injection which cures it up in three or four

[1] Deutsche med. Wochenschrift, 1885.

days. In this form the patient gives himself the disease much more than his partner gives it to him. He has a damaged patch of mucous membrane within his urethra, and any one of a number of exciting causes is sufficient to kindle the slumbering congestion into an active discharging inflammation with the aid of those micro-organisms which constantly inhabit the urethra and vagina, and under normal conditions remain there as harmless saprophytes.

In these cases the discharge may originate at a certain distance within the urethra from the very start. It may not commence at the meatus. The patient has intercourse perhaps with a woman who has no gonorrhœa—who at most has a purulent leucorrhœa. In twenty-four to forty-eight hours he presents himself to the physician for inspection, stating that he has an attack of gonorrhœa.

When inspection shows that the lips of the meatus urinarius are not swollen, the attack has manifestly not begun at the meatus. When, however, the cause is some irritating discharge from without, not gonorrhœal, commonly the evidences of commencing irritation appear at the meatus. The discharge may be thick and purulent from its very start. There may be little or no itching, or tingling, along the course of the urethra. There is some heat and smarting in the urethra during the urinary act, but very little discomfort between times.

A discharge starting in this way is not apt to be a true gonorrhœa; but it may go on and assume all the quality of the most intense gonorrhœal urethritis, accompanied by any of the complications of gonorrhœa, and absolutely indistinguishable from it clinically; or it may subside in a few days, or, at most, weeks, under moderate symptomatic treatment, and give very little discomfort. The latter termination is by far the more common.

**Symptoms of Specific and Intense Non-Specific Urethritis.**—Specific urethritis always commences at the meatus, inoculation with gonorrhœal pus is the cause, and there is always a period of incubation between the moment of exposure and the outbreak of the first symptom. This incubation period is usually from five to eight days, and sometimes much longer. When, however, the cause is not gonorrhœal, the evidences of irritation appear almost simultaneously with the cause or on the second day following; sometimes they are delayed up to the fourth or even sixth day, but rarely any longer.

The first symptom in these cases is an œdema of the meatus, which makes the lips of the urethral orifice pout. This swelling may be insignificant in non-specific urethritis; it is invariable in gonorrhœa. The color of the orifice of the urethra is pink rather than blue. The patient feels a sensation as though a hair had been caught in the meatus and was being drawn through it. There is a sensation, varying between a tickling and an itching, which is quite apt to be complained of, either at the

very meatus or at a point about three-quarters of an inch within the urethra, upon its under side. These sensations keep the patient's mind fixed upon his genitals, and call upon him to empty his bladder rather more frequently than usual. The passage of urine over the tender ends of the urethra causes a hot, stinging pain, an *ardor urinæ*, more or less intense, in different patients.

Between the lips of the pouting meatus, perhaps faintly sealed with dried mucus, a drop of watery pus is seen during the first twenty-four hours. On the second day this drop becomes more purulent, and all the disagreeable sensations increase, while from day to day the discharge becomes more copious and more purulent, except when under the influence of restraining treatment.

During the second week the pus from the urethra assumes a green tint, due to slight admixture with blood, and all the symptoms intensify, unless the discharge turns out to be a mild urethritis, in which case it sometimes reaches its height during the first week, and commences to decline during the second. This it never does if it is true gonorrhœa, and is allowed to run unchecked.

If the inflammation runs high at any period of the disease, erections become painful; the inflammation does not remain confined to the surface of the urethral membrane, but works down through the minute ducts into the mucous glands of the urethra, and spreads from thence to the delicate meshes of the spongy tissue of which the corpus spongiosum is composed. These meshes of tissue, becoming stiffened and agglutinated together by the inflammatory process over a given (usually limited) area, no longer allow themselves to become distended by the influx of blood which occurs during erection. As a consequence, when the rest of the penis is distended with blood, and only a limited portion remains empty, the empty part, being relatively too short, draws together the distended parts, acting like a cord to a bow, and the penis becomes curved, its point of greatest concavity corresponding to the inflamed area of the corpus spongiosum. The inflammation often does not run so high as to obliterate the meshes of the corpus spongiosum, but renders them sensitive when dragged upon. In such a case there will be a painful, perhaps hard spot in the urethra upon erection, but no bending of the penis.

This bending of the penis is called *chordee*. Painful erections are not uncommon during the third week of a gonorrhœa, and may continue until the discharge has ceased. These intense symptoms, notable in gonorrhœa, are dependent upon the pathogenic action of the gonococcus upon the tissues. This microbic agent is first implanted upon the epithelium of the meatus, where it rapidly proliferates and thence penetrates gradually between the cells into the subepithelial tissue. Here a high degree of irritation is set up around the blood-vessels, and all the phenomena of inflammation ensue. This entails desquamation, serous exu-

dation, migration of large numbers of white blood corpuscles, and general round-cell infiltration.

The intensity of the inflammation, and hence the symptoms produced, vary according to the number of gonococci, the rapidity with which they proliferate, and the susceptibility of the tissues.

During the second or third week, as the inflammation extends backward within the canal of the urethra, the deep urethral muscles are apt to be thrown into spasm, which leads to dribbling of urine and difficulty in voiding the contents of the bladder. Sometimes actual retention comes on, usually only in connection with active inflammatory congestion of the prostate and cystitis of the neck of the bladder. Abscess of the prostate, peri-urethral abscess, perineal suppuration, inguinal glandular abscess, and swelled testicle are among the complications of intense inflammation of the urethra. Inflammatory complications of the fundus of the bladder and of the kidneys occur, but are rare in connection with gonorrhœa unless neglected or ill-treated.

In some cases the prepuce becomes implicated in inflammation. This is due to a lymphangitis, generally of the smaller lymphatic vessels. As a result the foreskin may swell enormously, and become white with œdema, and this œdema may go on to involve the whole penis. It frequently leads to paraphimosis, when the prepuce is short. If the prepuce be long, phimosis is apt to occur, and occasionally the inflammation runs on to the extent of producing abscess between the layers of the prepuce.

When the prepuce is tight, although it may not become inflamed in its own texture, yet if the discharge is not kept carefully washed out of its cavity, the pus is liable to be retained in the furrow behind the glans penis, and there becoming decomposed, to give rise to balanitis and posthitis, and to lead to the formation of innumerable warts, the so-called venereal warts, which are always likely to be produced by uncleanness beneath the prepuce. The above evidences of extension of inflammation beyond and exterior to the mucous membrane are caused not by the gonococcus but by the ordinary pyogenic micro-organisms.

When the urethral inflammation runs high, hemorrhage from the urethra may occur, either spontaneously during erection or as a result of straightening the curved penis during erection. When the penis is so straightened the inflamed spot of corpus spongiosum may be ruptured through the mucous membrane of the urethra, and violent hemorrhage may follow, to say nothing of the traumatic stricture which is sure to appear subsequently at the point of rupture.

In those rare cases in which upward chordee appears on account of inflammation of the corpus cavernosum, violent straightening may cause effusion of blood within the sheaths of the corpora cavernosa, but rarely produces free bleeding from the urethral surface.

After the urethral flow has continued at its height for a period varying from one week to a number of weeks, the inflammatory symptoms gradually subside, chordee becomes less frequent and less intense at night, the discharge lessens, and finally ceases entirely. It may relapse, leading to a new discharge lasting for several weeks, or prolong itself indefinitely in the shape of a gleet, which is more or less puriform in different cases, and subject to exacerbation and improvement, from time to time, from varied trivial causes.

### Diagnosis, Duration, and Treatment.

Before deciding upon the proper course of treatment in a given case of urethritis, the determination of the cause upon which it depends is a necessary preliminary step.

In the light of our present knowledge regarding the causative agency of the gonococcus in cases of specific urethritis, it is hardly necessary to state that it is always proper to resort to the means already dwelt upon to determine the question of its presence in a purulent discharge from the urethra.

The treatment of a mild case of non-specific urethritis often resolves itself into a simple removal of the cause underlying it.

The treatment of specific urethritis and of the more intense form of non-specific urethritis requires a resort to active local and antiseptic measures, to be hereinafter described. It is often possible to reach a fair presumption regarding the character of a case of urethritis by plying the patient with such questions as will bring to light the period of incubation, if any, the intensity of the symptoms, the number and duration of previous attacks, and by taking account of the apparent health and habits of the individual. A patient who has had a number of previous attacks of mild urethritis, which have always yielded to simple measures, is apt to treat the whole question of gonorrhœa with small concern and to endeavor to impress his views upon his less experienced brethren. Such a man has rarely had more than one case of true gonorrhœa, the successive outbreaks being relapses of the original malady, or the result of morbid conditions, local or constitutional, which render him susceptible to irritating influences which do not act upon the normal urethra. A first attack of acute urethral inflammation, following a suspicious intercourse, is always strongly suggestive, on its face, of specific urethritis.

The patient who comes with his virginal attack of gonorrhœa is generally totally ignorant of the virulent nature of his disease, and deluded by the information of his friends. He should be informed that gonorrhœa, badly managed, is as serious a matter, in many cases, as syphilis; that gonorrhœa probably kills more patients than syphilis does, through its ultimate effect, by means of stricture of the urethra, upon

the bladder and the kidneys. The surgeon should refuse in any case to give a promise of cure in any specific time. No man can positively assert at the start whether a given urethral inflammation just commencing at the pouting orifice of a healthy urethra is to be a severe case or not, or whether it will yield a prompt response to remedies. While it is possible to settle at once the question of specificity by microscopic examination, it must not be forgotten that some cases of so-called non-specific urethritis have all the intensity of gonorrhœal inflammation and may run a prolonged course.

If a man has already had several attacks of gonorrhœa, and his present attack comes on without any œdematous swelling of the meatus urinarius, the chances are that the attack will be a mild one. If the case is one of first attack, and there has been not more than forty-eight hours' incubation, the chances also are that the inflammation will not be violent. If there has been no sexual intercourse at all to occasion the new outbreak, the course of the malady may be slow and its duration protracted, the symptoms may or may not run high.

**Diagnosis.**—The diagnosis of acute urethritis is generally easy, and depends upon the presence of a purulent discharge from the urethra with the attendant symptoms of inflammation. It must be distinguished from a balano-posthitis when the discharge collects between the glans and the prepuce and exudes from a phimosed opening.

The hypersecretion of the glands of the urethra and the prostate is of a non-purulent character, and thus is recognized. Sometimes the presence of a chancre within the urethra will cause a discharge from the meatus and mislead the surgeon, but a short lapse of time will generally bring to light the real cause. Having excluded the above sources of possible error, the diagnosis lies between specific and non-specific urethritis, which is determined by bacteriological examination.

Finally, when the gonococcus is sought for and not found, and the case appears to be one of a succession of similar attacks which have occurred at various intervals, structural changes in the urethra or morbid conditions of its adnexa are generally responsible for such acute outbreaks, and must be located by appropriate methods when the acute stage subsides.

**Duration.**—The duration of non-specific urethritis, when the exciting cause is derived from alcoholic excess or other means of local irritation, is generally short and readily controlled by the removal of such cause.

When the acute inflammation springs from a urethra already the seat of structural changes, the result of previous trouble, it will often subside in a short period under mild treatment, only to blossom out again later when sufficient cause recurs.

Urethritis occurring in rheumatic, tuberculous, and cachectic subjects is more apt to assume a severe form, and to extend over a prolonged period.

Severe non-specific urethritis and its prototype, true gonorrhœa, vary

in the length of their duration according to the intensity of the inflammation, the treatment employed, and the time at which treatment is commenced.

Formerly, under the rational measures of treatment then in vogue, a period of six or eight weeks was considered an average duration, and in severe cases longer periods were not considered excessive. At the present day claims are made of effecting a cure in as short a period as one week, and even less. In spite of this, however, two weeks must still be considered a short period of treatment, three weeks a reasonable duration, and four weeks not excessive.

To obtain these rapid results the patient must be seen early in the career of his disease, and the treatment continued in a most careful but energetic manner. It is more creditable to the surgeon to conduct a case through the course of the disease free from complications than to shorten its duration by one or two weeks.

**Treatment.**—The general treatment of all cases of urethritis should aim at an intelligent observation of the symptoms, and, according to the nature and intensity of a given case, the adoption of measures *hygienic*, *medicinal*, and *antiseptic*.

In all cases of gonorrhœal and severe cases of non-specific urethritis hygienic measures and absolute regularity of life should be enjoined from the start; anything like irregularity is detrimental. The patient should rest as much as possible, lying down rather than sitting or walking. He should avoid exercise and fatigue. In severe cases absolute confinement may shorten the period of the disease and render it more tractable to treatment. Regularity should be practised in sleeping and in eating, and particular attention should be bestowed upon the function of the intestine.

The amount of food taken should be moderate, its quality bland and unstimulating, its nature light and varied. If the patient be debilitated, on the other hand, plenty of meat should be allowed, the full ordinary amount of food should be taken, and in some cases even a little red wine, diluted with water, from the very beginning. Milk is an excellent article of diet in all cases. When it cannot be promptly digested, the work of the stomach may be made easier by adding salt to the milk; and a laxative, such as a dinner-pill, may be given at night, or a little compound licorice powder, or, if the patient prefers, a saline aperient water in the morning.

Among the articles of food to be avoided in all acute cases (excepting those coming on in decidedly debilitated subjects, when intelligent exceptions must be made), are pastry, gravies, fried fats, and greasy articles of food, all rich made-dishes and indigestible substances, all condiments of every description, excepting in the mildest form. Salt, however, is not objectionable; pickles and acids usually are. Asparagus is harmful to some patients.

Among the drinks to be avoided are strong coffee and tea; all wines and liquors of any description, particularly the fermented wines and malt liquors.

Soda water, root beer, and Vichy water may be used as beverages, and the more water that can be taken between meals the better, particularly one of the diluent mineral waters which pass rapidly through the kidneys. It is always well for patients to take a full glass of water upon retiring, so that the morning urine may be less dense than would otherwise be the case.

Smoking is not objectionable.

Everything which tends to sexual excitement, whether by thoughts, conversation, or actions, should be interdicted. The penis should be handled as little as possible.

This latter precaution must be strictly enforced for two reasons. In the first place, the constant pulling at the urethra, in order to see how much pus it contains and what its quality may be, is irritating to the inflamed mucous membrane of the canal. In the second place, fingering the urethra exposes the eyes of the patient to inadvertent inoculation. The caution of extreme cleanliness and avoidance of the contact of any pus from the urethra with the conjunctiva should be very forcibly given to each patient, and frequently repeated and insisted upon.

As a final hygienic precaution it is well for the patient to carry his testicles in a suspensory bandage, since the tendency to epididymitis is in this way decidedly lessened.

All the hygienic precautions alluded to should be held in force during the whole course of an urethral discharge, and for a certain period after its apparent cessation (a week to ten days), through fear of a relapse. But all the foregoing restrictions may be more or less relaxed in mild non-specific cases of urethritis.

**Internal Treatment.**—This comprises the use of:

*Alkalies and diuretics*, to render the urine bland and unirritating.

*Balsams, santal oil*, etc., which act favorably upon the mucous membrane of the urethral tract in passing out of the system.

*Sedatives and anodynes*, to lessen ardor urinæ when intense, and control chordee.

*Internal antiseptics* are sometimes used for their bactericidal action. For this purpose salol, fifty to sixty grains daily, or methylene blue, two grains three times a day, have been given but possess no established value.

The first thing to be done in severe, notably gonorrhœal cases is to see that the urine be made abundant and alkaline, so that it may be bland and unirritating in its passage over the inflamed surface of the urethral mucous membrane. To accomplish this dilution of the urine it may be enough to take an extra tumbler of water several times a day between

meals. Should the dilution of the urine not materially reduce its acidity, some alkaline drug may be given well diluted with water, and administered during the third hour after each meal.

The best alkaline drug, in cases of irritation of the bladder or urethra, is the citrate of potash. This salt, however, is unstable, and should always be obtained from a reliable pharmacist. In solution, after being kept for a time, it becomes changed to the carbonate of potash. The carbonate of potash, although a fair alkali, is not so good a diuretic as the citrate, and does not, as a rule, agree as well with the stomach.

The citrate of potash may be given in doses of five, ten, or fifteen grains three times a day, according to the effect upon the urine. Occasionally it disagrees with the stomach, even when taken in small amount. Under such circumstances it produces a sense of discomfort in the region of the stomach, perhaps nausea, possibly diarrhœa, and sometimes a pain in the head across the forehead. In these cases the remedy must be discontinued, and some other alkali tried. Vichy water and soda mint tablets may answer all purposes, one or two of the latter to be taken with each glass of vichy, several times daily.

If the case be one in which there is reason to suspect that the discharge comes from a patch of damaged urethra, strictured or not, which has been excited to suppuration—where, for instance, a drop of pus appears at the beginning of the attack in a meatus which is not œdematous or swollen, in such a case there is sometimes no occasion for any further internal medication than the alkaline diuretics already alluded to. A very mild injection may be used at once, increased in strength every few days; and very often in a short time the supposed gonorrhœa subsides, and the patient rejoices in an escape from a prolonged sickness which he had perhaps looked upon as inevitable.

Of all the internal remedies in vogue there is none more generally efficacious than the yellow oil of sandal-wood. This may be given in pearls or capsules, ten, fifteen, or twenty minims three times a day.

Sometimes it may be desirable to give the oil and the alkali combined in a single prescription, such as the following, which is not unpalatable:

| | | |
|---|---|---|
| ℞ Ol. santali, | . . . . . | ℥ ss.–i. |
| Liq. potassæ, | . . . . . | ʒ ij.–iv. |
| Syr. acaciæ, | . . . . . | ℥ i. |
| Aquæ fœniculi, | . . . . . q.s. ad | ℥ iij. |

M. S. Teaspoonful, well diluted, after eating.

The oil of gaultheria may be substituted for the sandal-wood in the above prescription in the same proportion, sometimes with good effect. It may be administered alone in capsules. In like manner the oil of eucalyptus may be preferred, according to individual peculiarities in a given case.

Sandal oil agrees with most stomachs much better than copaiba. It

produces no trouble upon the skin, and is not apt to excite diarrhœa. When it disagrees, it generally does so by causing intense pain in the back, over the region of the kidneys. In pushing the drug to obtain its full effect, it is well to increase the dose until some uneasiness is complained of in this region, and then to reduce it for a day or more, waiting for the pain to subside, as it does quite promptly. After this the drug may be resumed at an appropriate dose.

The effect of sandal oil in full doses is usually soothing to the patient's sensations. In cases of ordinary urethritis it often promptly modifies the intensity of the discharge. In true gonorrhœa it is less effective, and may exert no influence whatsoever without the use of local measures.

The *balsam of copaiba* is a time-honored remedy for urethral inflammation, is inexpensive and therefore generally quite pure, no matter where obtained. Copaiba is often a very useful drug in the treatment of urethritis, but it is nowadays less often employed when much reliance is placed upon the local measures. In these cases, when it is impossible or inexpedient to use local means, its use in one of the various combinations may prove of decided value. In non-specific urethritis it may be used at any period, but in true gonorrhœal urethritis it is more suitable for the later stages. Indeed in some instances the symptoms of gonorrhœa are rendered more intense by the too free use of balsams (copaiba or cubebs) in the early stage. The balsam may be given in combination with an alkali, in a prescription similar to the one already advised for sandal-wood oil, or in one of the following mixtures:

| | | |
|---|---|---|
| ℞ Bals. copaibæ, | | ℥ ss.–i. |
| Liq. potassæ, | | ʒ ij.–iv. |
| Syr. tolu, | | ℥ iss. |
| Extr. glycyrrhizæ, | | ʒ ij. |
| Aquæ menth. pip., | q.s. ad | ℥ iij. |

M. Shake. S. One to two teaspoonfuls at a dose.

| | | |
|---|---|---|
| ℞ Bals. copaibæ, | | ʒ iv. |
| Syr. tolu, | | |
| Syr. acaciæ, | | |
| Aquæ menth. pip., | āā | ʒ viss. |

M. Shake. S. Teaspoonful t.i.d.

The balsam may be administered in an endless variety of combinations, mixed with sandal oil, with cubebs, and in countless mixtures which are prepared by different drug houses from the favorite prescriptions of various physicians. In general, the method by tablets or capsules is most convenient and palatable, since the drug is tasted only during the regurgitations in the throat, which are so constant and offensive in some people when they take copaiba. The odor of the balsam also remains on the breath, and is quite strong in the urine of the patient in all cases.

Copaiba disagrees with many patients. It causes acute indigestion in some, and more moderate dyspepsia in others. Sometimes it will not stay down at all, but is rejected by the stomach. Occasionally it produces headache and great depression of spirits. Sometimes it causes diarrhœa. The urine, when full of copaiba, may coagulate under heat in a manner suggestive of the presence of albumin.

One of the specific effects of copaiba is to produce an acute eruptive disorder, known as copaibal roseola or erythema. Its advent is frequently announced by a chill, with headache and nausea, sometimes by diarrhœa and considerable fever. The eruption is general, and consists of red raised blotches which itch intensely.

When the eruption appears, the urethral discharge becomes greatly modified, or ceases entirely, but it generally returns as the eruption fades.

The treatment of copaibal erythema is to give plenty of fluids by the mouth, and bland diuretics, to assist the kidneys in eliminating the offending substance from the blood. Warm baths are comforting, especially if they contain a little baking-soda—about one ounce to thirty gallons—or some of the infusion of bran, as in the ordinary bran-bath. Dusting the skin with starch-powder is cooling, and a few days generally suffices so to moderate the eruption that the itching is no longer distressing. On the first appearance of this eruption the copaiba must be stopped; but it may be resumed again, if it be desired, in smaller doses, after the eruption is well on the decline.

*Cubebs* is another remedy which has stood the test of time; it may be administered as a powder, or in drachm-doses of the fluid extract. The oleoresin is a very useful preparation, notably in the subacute and chronic cases and in the declining stage of acute urethritis; not in the early stage. The dose is from ten to thirty minims, and it may be administered in various ways. Small quantities are easily taken upon a lump of sugar, larger doses best in capsules. One capsule at a dose is enough to begin with, to be gradually increased. Patients generally halt at three capsules at a dose, but sometimes they take four.

The effect of cubebs in moderate doses is rather to stimulate digestion and act as a tonic. The breath smells of it, and the urine is full of its odor. Large doses are distinctly irritating to the stomachs of most patients, and cause diarrhœa, with griping pain. If the neck of the bladder happens to be at all congested, or if the organ tends to be irritable, cubebs is generally harmful, since it aggravates such conditions, and, if pushed, may go so far as to bring on inflammation of the neck of the bladder. If the local antiseptic treatment of gonorrhœal urethritis is objected to and an antiphlogistic *régime* is preferred, the proper manner of adopting such a course is to hold to the use of alkalies and diluents until the acute symptoms subside, and then to resort to the use of cubebs

and copaiba during the last stage. Guiard of Paris commends this course in all cases.

*Turpentine* is sometimes distinctly useful in the declining stage, and in subacute or chronic cases of urethritis; it may also be given in those cases in which cubebs does not agree. The oil of turpentine may be taken upon a lump of sugar, in five- to twenty-drop doses, three or four times a day. If preferred, it may be given very conveniently in the form of the pearls of turpentine (♏ v.), as they are called, prepared by various manufacturers. The dose of these is from one to three.

Sometimes turpentine acts as an irritant, just as cubebs does, and induces frequent urination. In such case, the remedy must be changed or the dose lessened. The tincture of cantharides has somewhat the same range of action as turpentine, but should be still more exclusively confined in its use to the subacute and chronic stages. It is given in ♏ iii.–vi. doses three times daily, well diluted.

One of the following combinations of the above preparations, which are put up in capsules by different chemists, may be chosen according to the lights of the physician and the peculiarities of different cases:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Copaibæ, | ♏ vi. | Copaibæ, | ♏ v. | Copaibæ, | ♏ iij. | Salol., | gr. iiss. |
| Cubeb.ol.resin., | ♏ ij. | Ol. santal., | ♏ v. | Ol. resin. cubeb., | ♏ iij. | Ol. santal., | ♏ v. |
| Ol. santal., | ♏ ij. | | | Ol. resin. matico, | ♏ i. | Pepsin., | gr. i. |
| | | | | Ol. santal., | ♏ iij. | | |

The oil of sandal-wood and salol are suitable to all stages of acute urethritis, but the other combinations to the subacute and chronic cases and to the later stages of acute urethritis.

When chordee and ardor urinæ become severe in spite of the use of alkalies and diluents, it is necessary to employ additional remedies to control these symptoms. Sometimes the addition of a small amount of codeine, gr. $\frac{1}{8}$–$\frac{1}{4}$ three times a day, may be sufficient to palliate them. This may be given in a tablet triturate or added to the liquid mixture. A large dose of codeine (gr. ii.), given at night, may prevent chordee. Phenacetin (gr. v. or x.), lupulin (gr. xxx.–lx.), and bromide of potassium (gr. lx.–xc.) are sometimes taken for the same purpose before retiring. The objection to lupulin is that it is very bulky, and to the bromide that it upsets the stomach in such full doses.

The tincture of hyoscyamus is an excellent remedy for controlling the ardor urinæ. It may be administered in one of the mixtures already mentioned:

℞ Codeinæ [spts. rect. q.s. ad sol.], . . . . gr. iij.–vi.
Ol. santali (or gaultheria, or eucalyptus), . . . ♏ ss.
Tinct. hyoscyami, . . . . . ʒ iss.
Liq. potassæ, . . . . . ʒ ij.
Syr. acaciæ, . . . . . q.s. ad ℥ iij.
M. S. Teaspoonful three times a day.

In this mixture the codeine need not be included unless needed. The oil may also be removed and given instead in capsule form.

Finally, some cases of non-specific urethritis, which occur as a result of an oversensitive state of the urethra, accompanying diathetic conditions, anæmia, and malnutrition, require such internal remedies as will directly benefit the underlying condition. Iron and arsenic as general tonics, cod-liver oil and creosote for some cases, will at times, in addition to the local or internal treatment already instituted, be the means of bringing about a favorable result.

Before proceeding to the consideration of the local treatment of acute urethritis, attention should be called to the fact that there are two methods in vogue of treating this malady, either one of which may result in a safe and complete cure, but with a decided difference in the period of duration.

The antiphlogistic method recommended particularly by Fournier and Guiard of Paris, and others, disapproves of the employment of any local measures in the early stage when the acute symptoms run high, but relies upon the free use of alkaline diuretics and diluents during this period, which is intended to permit the discharge to flow freely without restriction, and only when the discharge has materially decreased and the acute stage has subsided are local measures adopted. The latter consist of astringent injections in some form or of irrigations.

The alternative course, and the one recommended in this book, consists in the adoption of local measures at the onset of the inflammation, for the purpose of destroying or restraining the microbic agents and curtailing the attack of the disease.

## Local Treatment.

The local measures adopted in the treatment of urethritis should vary according to the nature and intensity of the inflammation.

The judicious use of local applications in specific urethritis is the most important feature in the treatment of this malady when, the presence of the gonococcus having been established, it is desired to cut as short as possible the stay of this micro-organism in the urethra.

In cases of non-specific urethritis, intense and active, local measures play an important rôle in the treatment; while in mild non-specific cases, and those which depend upon diathetic and constitutional causes, such means are often unnecessary, and may even be the cause of prolonging the symptoms.

The different therapeutic agents adopted for urethral medication are intended to exert germicidal, astringent, or stimulating effects, as the case may require, and are employed by means of copious irrigations, instillations or injections, and in soluble bougies.

**The Abortive Treatment of Gonorrhœa.**—It is generally conceded that an abortive treatment of gonorrhœa, to be successful, must be resorted to within a few hours after the first appearance of the urethral discharge. While many of the local antiseptics, commonly employed at the present time, have the effect of shortening the course of a gonorrhœa, they cannot strictly be considered as abortive measures. A treatment which is deserving of this title must quash the disease at its onset and prevent its evolution. For this purpose the permanganate of potassium has been employed in strong solutions (1 : 500 and 1 : 1,000) by copious irrigations of the anterior urethra a few hours after the discharge appears; also the nitrate of silver (2–4 per cent solution) and corrosive sublimate (1 : 1,000), which are injected with an ordinary urethral syringe with a capacity of about two drachms. The pain and distress following the use of these injections are very intense, but when successful the sero-sanguinolent discharge, which subsequently appears, subsides in a day or two of its own accord. This treatment is harsh, and seldom employed for this reason, and because the patient is not seen early enough. Its success depends upon the destruction of the gonococci before they have penetrated beneath the epithelial lining of the urethra.

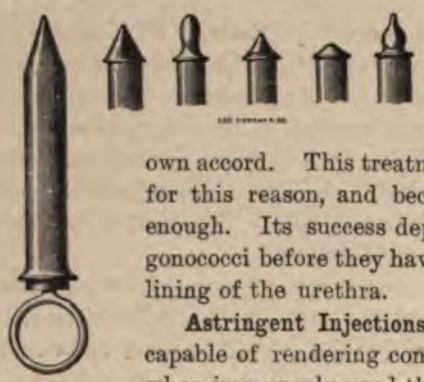


FIG. 1.

**Astringent Injections.**—Injections of the urethra are capable of rendering considerable service in urethritis, but when improperly used they may occasion much mischief.

In gonorrhœal urethritis, if they are used at the beginning of the disease, there is grave danger of carrying the inflammation backward and of lighting up posterior urethral complications, especially when the agent employed possesses astringent properties only and is not destructive to the gonorrhœal virus.

In specific urethritis, then, if the local treatment is not directly antagonistic to the life of the gonococcus, such as may be obtained by copious irrigations of the urethra with permanganate of potassium or by the local application of the silver preparations, it is far better to follow the treatment advised by Fournier, Guiard, and others, and postpone all local measures until the later stage, when the acute symptoms shall have subsided. It is at this late stage that the judicious use of a mild astringent injection may sometimes be of service.

Frequently in subacute urethritis and in non-specific cases generally one of the astringent injections may be employed with good effect. It is often the case, however, that the discharge, which is checked by the use of an injection, promptly returns when such injection is discontinued. This relapsing urethritis is generally due to morbid changes in the urethra

and to underlying constitutional conditions. Such cases of relapsing urethritis which persistently recur properly come under the head of chronic urethritis (*vide* page 37).

A final precaution concerning the use of injections is that they occasionally produce and keep up a discharge on account of being inappropriately strong. This is quite likely to occur with those patients who frighten themselves into the belief that they have gonorrhœa when such does not exist, and who commence a fierce onslaught on the urethra with injections—a treatment which promptly excites a flow of pus and confirms their fears. On the other hand, at the end of a gonorrhœa, when an injection of undue strength has been employed to arrest the discharge, an oozing of gleety mucus may keep up, maintained by the use of a strong injection which is persisted in.

In either one of this class of cases rapid improvement follows a cessation of the injection.

In injecting the urethra a proper syringe should be used, one which is not too blunt nor yet which is made with too long a nozzle. This may be varied according to the size of the meatus in an individual case (Fig. 1). In order to obtain the proper degree of distention of the canal, the capacity of such a syringe should be between 2 and 3½ drachms. The syringe is filled with the injection and the air expelled. The penile end is introduced snugly within the mouth of the meatus and the fluid injected by making firm, steady pressure upon the piston. The contents of the syringe having been thus emptied into the urethra, the latter is withdrawn and the fluid retained by closure of the meatus with the thumb and index finger for ten seconds for an astringent injection; much longer when the object is to destroy micro-organisms as with one of the silver preparations. It is always proper to urinate before making the injection, thereby emptying the canal of any accumulated discharge.

The different astringent preparations used for urethral injection are zinc sulphate, sulpho-carbolate, and permanganate, alum, subacetate of lead, bismuth, and fluid extract of hydrastis. One of the following formulæ may be employed:

℞ Zinci sulphatis, . . . . . gr. iij.–vi.
Liq. plumbi subacetatis dilut., . . . . ℥ iv.
M. To be filtered.

℞ Zinci sulphatis, . . . . . gr. iv.
Bismuth., . . . . . ʒ ij.
Pulv. acaciæ, . . . . . ʒ i.
Aquæ, . . . . . q.s. ad ℥ iv.
M. To be well shaken.

℞ Zinci permanganat., . . . . . gr. i.–iv.
Aquæ, . . . . . ℥ iv.
M.

℞ Zinci sulphatis, . . . . . gr. ij.–iv.
Ext. hydrastis fld., . . . . . ʒ i.–iv.
Aquæ, . . . . . ℥ iv.
M.

℞ Aluminis, . . . . . gr. iv.–viij.
Zinci sulphatis, . . . . . gr. ij.–iv.
Aquæ, . . . . . ℥ iv.
M.

The frequency with which the above astringent preparations should be used must be governed by the quantity of the discharge and the controlling influence exerted upon it by the injection. A proper rule to follow is to use the injection only sufficiently often to keep the discharge in check. When the discharge persists in spite of its usage after a reasonable length of time, or when relapses occur as often as the injection is discontinued, it may be taken as an indication that the agent employed is acting as a source of irritation rather than a means of relief, or that there is trouble deeper down the canal than is reached by the injection (posterior urethritis) or perhaps deeper in the tissues themselves.

**Urethral and Intra-Vesical Irrigations.**—The method of irrigating the urethra in the treatment of gonorrhœa is not new. It was used over five years ago by different investigators, notably by Halstead, of Baltimore, and Brewer, of New York, who employed the bichloride of mercury for this purpose. More recently the permanganate of potassium has come into popular favor on account of its marked destructive action upon the gonococcus, and of the admirable results reported in its use by Janet, of Paris, who has carefully laid down a method of treatment which bears his name.

Janet's method is shown in the accompanying table, which is extracted from the treatise of Dr. Desnos, of Paris:[1]

| | 8 A.M. | Afternoon. | 9 P.M. |
|---|---|---|---|
| First day | ..... | * A. U. 1 : 1,000 | * A. U. 1 : 4,000 |
| Second day | * A. U. 1 : 3,000 | | 7 P.M. |
| Third day | † A. P. U. 1 : 2,000 | ..... | * A. U. 1 : 4,000. |
| Fourth day | ..... | † A. P. U. 1 : 2,000 | † A. P. U. 1 : 4,000 |
| Fifth day | † A. P. U. 1 : 2,000 | ..... | † A. P. U. 1 : 4,000 |
| Sixth day | ..... | † A. P. U. 1 : 2,000 | |
| Seventh day | ..... | † A. P. U. 1 : 1,000 | |
| Eighth day | ..... | † A. P. U. 1 : 1,000 | |
| Ninth day | ..... | † A. P. U. 1 : 1,000 | |
| Tenth day | * A. U. 1 : 500 | † A. P. U. 1 : 1,000 | |

* A. U. = anterior urethral irrigation.
† A. P. U. = anterior and posterior urethral irrigation.

The anterior irrigation is conducted by means of a conical-shaped nozzle fitted to the meatus, and a fountain syringe or irrigator. The

[1] "Traité elementaire des Maladies des Voies urinaires," par le Dr. E. Desnos. 1898

posterior urethra is irrigated with the same nozzle by distending the anterior urethra with the solution and raising the reservoir to a height sufficient to overcome the resistance of the cut-off muscle (between six and eight feet). The method of Janet, as shown in the above table, is too dogmatic. The treatment can be best utilized by varying the strength of the permanganate solution according to the susceptibility and sensitiveness of different urethras. We find that weaker solutions in the beginning of the disease are better tolerated and produce the same results.

It is entirely unnecessary in the early stages of the disease to extend the irrigation to the posterior urethra. In some cases recovery occurs before this region is reached by the disease when it need not be invaded by the treatment at all. In other cases not so favorable, at the expiration of a week or ten days, the proximity of the inflammation is likely to be such that the posterior canal should be irrigated as a matter of precaution if not necessity.

FIG. 2.—Chetwood's Alternating Shut-off.

The method of forcing the resistance of the cut-off muscle is also unnecessary, and is likely to cause undue irritation when the inflammation of the urethra is acute. Swelled testicle has often been produced by it. Even if it be a safe procedure in the hands of one specially trained and practised in its use, it is not proper to advise it as a routine method.

In employing the Janet method we begin with a solution of 1 : 5,000 or 6,000 permanganate of potassium, and increase the strength during the first week up to 1 : 4,000. The treatment is given once or twice daily in the early stage of the disease; generally once a day is sufficient to keep the discharge under control, if not it should be employed twice daily. At the end of the first week or ten days the irrigation includes both the anterior and posterior urethras, unless the case has proved a very tractable one and all symptoms have subsided before this period. This treatment is not stopped abruptly, but continued after the discharge has ceased and both flows of urine are clear, at which period an interval of one or two days is allowed to intervene between the treatments. The method of applying this treatment, which has proved most satisfactory, is carried out by means of a special instrument (Figs. 4, 5, 6) designed for this purpose, and enables the operation to be conducted without damage and with-

out dirt. It permits a moderate amount of distention of the canal, which is essential, and provides for the emptying of the urethra without with-

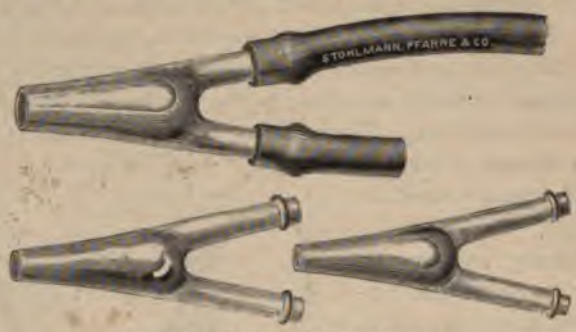



FIG. 3.—Chetwood's Urethral Nozzles.

drawal of the nozzle of the instrument. A catheter was formerly used for irrigating the anterior urethra, but is unsatisfactory as it does not produce a proper distention of the canal. An ordinary cone-shaped nozzle, which must be withdrawn after each inflation to empty the canal, is unwieldy and less cleanly.

The distinctive parts of this apparatus for urethral and intravesical irrigation consist of a glass nozzle (Fig. 3), which has one large opening at its penile extremity, connecting with two arms, one for the inflow and one for the outflow current, and the alternating shut-off (Fig. 2),

FIG. 4.—Anterior Urethral Irrigation. The irrigating fluid is allowed to fill the nozzle to displace the air before coupling, and is retained by the little finger over the exit tube.

which is intended to open and shut the tubes attached to the two arms of the nozzle alternately; so that by impeding the outflow current, when the fluid enters the urethra, an even distention of the canal is produced; and by obstructing the inflow current after the urethra is full, complete ejection of its contents is insured. The amount of distention is regulated by the height of the reservoir, four and a half to five feet being sufficient to irrigate the entire anterior section of the canal and produce the proper amount of distention. The pressure may be varied when pain is com-

FIG. 5.—Anterior Urethral Irrigation. The foreskin is retracted and the nozzle coupled with the meatus, when the fluid is allowed to enter the urethra by opening the shut-off.

plained of, by partially closing the inflow tube. This apparatus may be used to irrigate the posterior urethra without a catheter by elevating the reservoir sufficiently to overcome the resistance of the cut-off muscle (six to eight feet). In acute urethritis it is well to employ the catheter for posterior irrigation, having previously thoroughly irrigated the anterior canal.

For posterior urethral irrigation a No. 6 or 7 English catheter is carefully lubricated[1] and slowly introduced until a few drops of urine indicate that the bladder is reached. Before attaching the irrigating tube to the catheter the bladder is completely emptied, after which *the catheter is withdrawn about one inch* so as to direct the flow between the membra-

[1] A *soluble* lubricant should be employed so as not to arrest the action of the irrigating fluid. "Lubri-chondrin," which is made from Irish moss, and several saponaceous lubricants possess this property.

nous and prostatic urethras and thus insure distention of the entire posterior urethra. When the bladder is filled the catheter is entirely withdrawn and the patient is told to void the vesical contents by urinating. About one quart of solution is used for anterior irrigation and from eight to twelve ounces for the posterior portion, according to the capacity of the bladder.

It is of great importance in acute urethritis to irrigate thoroughly the anterior urethra before introducing the catheter into the posterior canal.

FIG. 6.—Anterior Urethral Irrigation. The urethra being distended the shut-off is closed, which opens the outflow tube and the urethra promptly empties.

Attention to this detail may be the means of avoiding unnecessary complications.

The permanganate of potassium irrigations, while used more particularly in specific urethritis, are also applicable to the treatment of non-specific cases, notably those in which the discharge is profuse and purulent, the difference in the management being that it is rarely, if ever, necessary in the latter form to irrigate more than once a day, and the posterior urethra need never be invaded unless it is apparent that the inflammation is located in this region.

### THE TOPICAL USE OF THE SILVER COMPOUNDS.

The nitrate of silver has long been employed as a topical application for inflammatory conditions of the urethra. Its use as an abortive measure in gonorrhœa has already been referred to. Its value depends upon its bacter-

icidal action, which is especially directed against the gonococcus. In view of this valuable property of the silver salts and of certain disadvantages attributed to the nitrate, there have been introduced several new silver compounds, all of which claim to possess the bactericidal action of the nitrate and to be devoid of its objectionable features. These preparations are the citrate of silver of Credé, argentamin, argonin, and protargol. The nitrate of silver is a good local antiseptic for urethral use in solutions from 1 : 2,000 to 1 : 500. It is applicable to both the specific and non-specific forms of acute urethritis. It is applied to the anterior urethra by means of an ordinary urethral syringe (Fig. 1) or with the Keyes-Ultzmann syringe (see Fig. 18, page 46); but the beneficial effects of this and of all the silver preparations are more especially obvious in the last stage of urethritis, when the acute symptoms have subsided, notably as a deep urethral application in posterior urethritis by means of the deep urethral syringe. The nitrate of silver is thus employed in increasing strength, beginning at 1 : 1,000 and increasing according to the tolerance of the urethra in each individual case. Such applications are made at intervals of one, two, or three days, and are often the means of terminating the last stage of a gonorrhœa after it has reached the deep urethra.

The disadvantages attributed to the nitrate of silver are that it stains the linen and the hands, is more or less irritating, and that it precipitates the albumin of the tissues, thus limiting its range of action. Regarding these objections, the first renders it unsuitable for the patient's own use; the second depends more or less upon the strength of the solution and the individual susceptibilities of different urethras, while in spite of the third objection it seems to exert its influence somewhat deeper than the permanganate of potassium does, although it does not check the discharge, when copious, as well as the latter remedy. The citrate of silver and argentamin will not be found less irritating than the nitrate or more effective. Argonin may be used in much stronger solutions without causing irritation (five to ten per cent), but relapses sometimes occur during its use in acute specific urethritis, showing that it permits the gonococcus to get beyond its reach.

Protargol has been used in the clinic of Lewin and Frank of Berlin, and by Neisser, apparently with gratifying results in acute gonorrhœal urethritis. Its employment is recommended in a solution of one-half to one per cent, to be retained in the urethra for half an hour once a day and ten minutes twice a day. The gonococci are said to disappear permanently from the urethra in from two to five days. When used in the last stage of gonorrhœa in the posterior urethra in place of the nitrate, it should be employed in stronger solutions than in the anterior urethra, beginning with two and a half per cent and working up, if possible, to ten per cent. In this stage we believe it to be of more value than in the acute condition, in which it is inferior to the permanganate of potassium.

The claims of superiority of these various silver compounds over the nitrate are not universally indorsed. When the daily office attendance necessitated by the irrigation treatment is too exacting upon the patient in cases of specific urethritis, a five-per-cent solution of argonin or of one-half per cent protargol may be ordered for the patient's own use, to be employed by means of an ordinary urethral syringe, with a capacity of 2 or 2½ drachms two or three times daily, and good results may follow such treatment. In some instances these injections have been employed in conjunction with the permanganate of potassium irrigations. This combination of both the irrigations and the silver preparations applies, of course, to the specific form of the disease.

A *résumé* of the local means to be adopted in the treatment of acute urethritis is as follows: When the conduct of the treatment can be entirely under the control of the surgeon, the good results attained by the use of copious irrigations of the urethra with permanganate of potassium strongly

FIG. 7.—Gonorrhœa Bag.

recommend this mode of treatment before all others. The silver preparations, argonin and protargol, may be used by the patient in specific urethritis when the more exacting treatment is impracticable. A combination of the irrigation treatment with the judicious use of one of the silver preparations is serviceable in some cases of acute specific urethritis. The application to the posterior urethra of the nitrate of silver or of protargol will often assist in terminating the last stage of urethritis, and it is at this period that the silver preparations seem to exercise their most beneficial effect.

Finally the use of the astringent injections by means of an ordinary urethral syringe is more applicable to subacute non-specific cases of urethritis, although sometimes of service in the declining stage of gonorrhœa, when the specific element has been destroyed.

The *dressings of the penis* in urethritis when the discharge is abundant become a matter of importance, and may prevent the occurrence of balanitis and posthitis, and vegetations around the foreskin, all of which conditions are frequently due to the collection of irritating discharges.

When the discharge from the penis is slight and of a non-purulent character, a plug of cotton, dry or moistened with mild sublimate solution, placed over the meatus and retained by the prepuce, may be a sufficient dressing; but when copious it is necessary to provide something better to catch the flow and protect the clothing. Gonorrhœa bags,

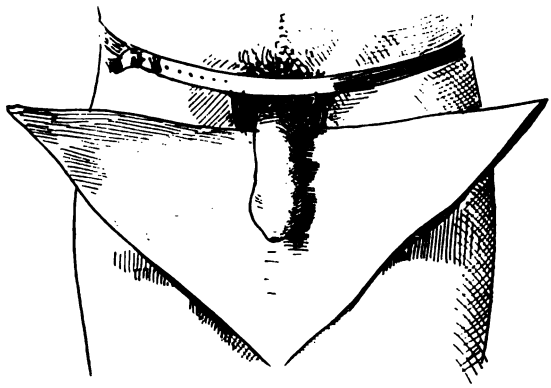


FIG. 8.

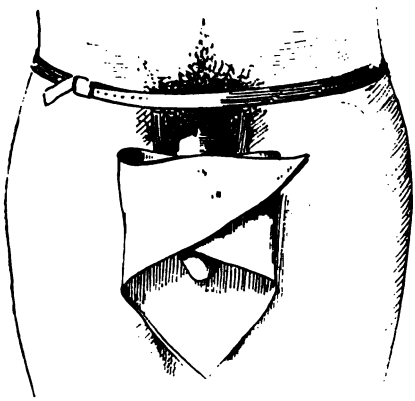


FIG. 9.

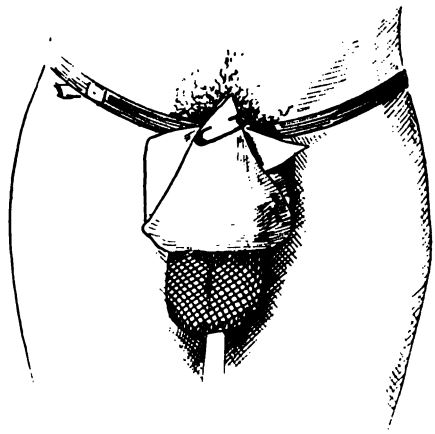


FIG. 10.

FIGS. 8, 9, and 10.—Dressing for Gonorrhœa.

made of rubber or muslin, are sold by druggists for this purpose (Fig. 7). The bag is suspended from the waist by means of tapes, and a piece of absorbent cotton, dry or moistened with an antiseptic solution, is placed inside. The cotton should be changed frequently. Another satisfactory dressing, worn in connection with an ordinary suspensory bandage, consists of a piece of absorbent gauze, folded in the shape of a

triangle. The base of this, about ten inches wide, is placed underneath the penis, and the three corners are folded over and pinned together to the band of the suspensory (Figs. 8, 9, 10). Such a dressing may be changed as frequently as is necessary, according to the amount of discharge. In all cases general cleanliness should be strictly observed. The discharge should not be allowed to accumulate behind the foreskin. A mild anti-

FIG. 11.—Taylor's Duckbill Syringe.

septic wash should be employed daily, and if the foreskin cannot be retracted, a duckbill syringe (Fig. 11) should be used to wash the cavity of the prepuce. For purposes of general cleanliness, as well as when balanitis or posthitis exist, a solution of corrosive sublimate, 1 : 6,000 or 8,000, may be used, or the following astringent and antiseptic lotion:

| | | |
|---|---|---|
| ℞ Thymol, | . . . . . | gr. i. |
| Sulpho-carbolate of zinc, | . . . . . | gr. i. |
| Boracic acid, | . . . . . | ʒ i. |
| Fluid extract of hydrastis (colorless), | . . . . | ʒ ij. |
| Aqua gaultheriæ, | . . . . . | q.s. ad ℥ iv. |

# CHAPTER II.

## CHRONIC URETHRITIS.

**Etiology.**—Chronic urethritis is generally the result of a prolonged, neglected, or ill-treated gonorrhœa. It may occur, however, independently of gonorrhœa, notably in subjects of a gouty, rheumatic, or tuberculous diathesis. It also seems to be the case that tuberculous and rheumatic subjects who acquire gonorrhœa are more liable than others to posterior urethritis and other complications, as well as to the protraction of the malady into the chronic condition commonly called gleet.

Clinically speaking, we recognize several forms of chronic urethritis: First, one which is in direct continuation of recent acute inflammation, in which the symptoms are pronounced and the discharge of a variable character, often rather free. This may last anywhere from three to six months, even longer.

In the second form the discharge is decidedly scanty, and has been present for a much longer period—perhaps for years.

A third form shows itself as a continual tendency to recurring attacks of acute or subacute urethritis, between which there may be practically no signs of trouble. These several forms are dependent upon various causes. The first may be due to the continued stay of the gonococcus in the urethra, to constitutional debility, to the existence of complications, or to badly directed treatment, and sometimes to too long continued or too energetic local measures. The second and third forms are generally dependent upon stricture or other morbid changes in the urethra or adjacent structures, catarrhal and mildly inflammatory conditions excited into activity by various causes—intercourse, alcohol, fatigue, etc.—or are dependent upon diathetic conditions, gout, scrofula, tubercle, etc. According to *some* recent investigators it is rare to find the gonococcus in very old cases of chronic urethritis.

**Pathology.**—When the urethra has been the seat of several attacks of acute and intense gonorrhœa, notably if complicated and not properly controlled by treatment, the general tissue and follicles are apt to become structurally altered in a mild, chronic, inflammatory way, and thus to render the subject prone to frequent acute outbreaks from causes which do not affect the mucous membrane when it is healthy. Chronic urethritis may be located in the anterior or posterior urethra, or both. A favorite site in the anterior urethra is the sinus of the bulb, but the trouble may be disseminated throughout the spongy portion. The morbid changes

consist in alterations in the color and transparency of the mucous membrane, structural changes in the epithelium, alterations in the follicles and glands, which may become distended with retained pus, their ducts being dilated or occluded, or the glands may become obliterated as the result of formation of new fibrotic tissue. Finally granulations form on the surface of the mucous membrane, a starting-point of stricture. In the posterior urethra the changes are more or less analogous, but, owing to the structures liable to be involved, the condition here becomes more important and the symptoms are more complex. The mucous membrane is swollen and congested; the veru montanum elevated and softened; the glands and follicles present the same changes as in the anterior urethra, and one or both of the ejaculatory ducts may become catarrhal or even occluded. The inflammation in the prostatic canal may result in engorgement of the neck of the bladder, and eventually in contracture of the sphincter (see Prostatitis).

**Symptoms.**—In chronic *anterior* urethritis the discharge is continuous. It may be slight and the quantity may be greater on rising in the morning, but this is due to over-night accumulation. It may be so scanty as to cause a slight glueing together of the meatus, or, on the other hand, it may be continuously copious. In the latter instance the existence of anterior urethritis is self-evident, although there may coexist posterior urethral inflammation. The discharge is practically the only symptom present in chronic anterior urethritis, as there is generally no pain or other discomfort. By obtaining the urine in two separate flows it will be seen that the second is perfectly clear; or, having previously washed out the anterior canal, the urine voided will be found entirely free from pus. If a conical bulbous bougie be passed into the anterior urethra (a bulb as large as the meatus will admit) down to but not into the membranous portion, when the urethritis is confined to the anterior canal, a tender spot may be detected somewhere along the urethra during the introduction of the instrument; and when it is withdrawn, a small amount of pus will generally be found upon the shoulder of the bulb. The damaged area in this manner may be located in the bulb, in the fossa navicularis, or in some part of the urethra between these points. In the case of multiple strictures the site of the inflammatory area will be found behind the points of contraction.

In chronic *posterior* urethritis, unless accompanied by anterior inflammation, the discharge is intermittent. When slight it appears only in the passage of the urine, but when more abundant collects at the meatus in the form of a morning drop, or the flow may be provoked by the act of straining at stool. There is not uncommonly a certain amount of frequency of urination; the desire is urgent but not imperative, and accompanied by more or less burning at the end of the penis. When the pain and the desire to urinate persist after the urine is voided, it is an

indication that the neck of the bladder is involved, and when there is pain in the perineum in the intervals between urination, there exists in conjunction with the urethritis a prostatitis. In exploring the urethra with a blunt steel or bulbous instrument, after previously washing the anterior canal, it will be noted that no pus is expressed from the anterior region; but as soon as the posterior urethra is reached, a sharp pain is produced, and the withdrawal of the instrument is accompanied by a discharge of pus. Of course when this condition exists in a very mild degree, the amount of discharge obtained may be minute, but the sensitive area will have been located in the region where the trouble exists.

Endoscopic examination is useful for the anterior urethra, and will reveal the general condition of the mucous membrane. The mouths of distended follicles may be distinguished if pus exudes from them, and we may detect the presence of granulations or warty excrescences on the urethral surface. For the posterior urethra the endoscopic examination is less useful. It is productive of great pain, and sometimes the source of unnecessary irritation.

FIG. 12.—Electric Head Lamp.

**Diagnosis.**—In reaching a diagnosis regarding the location of chronic urethritis, it should be remembered that the discharge is liable to be continuous in anterior and intermittent in posterior urethritis; that the symptoms of urgent, frequent, and painful passage of the urine are absent in anterior and may or may not be present in posterior urethritis. Unless there coexist a certain amount of cystitis, these latter symptoms are not marked. The urine should be voided in two separate glasses, the urethra having been previously carefully washed with plain lukewarm water. The washings will thus contain the product of the front urethra, the first flow of urine the posterior urethral pus, and the second the urine as it exists in the bladder. The bulbous bougie or blunt sound will detect the contracted or sensitive areas, and in making these explorations it is important to separate in the examination the anterior and posterior portions of the canal.

*Urethroscopy* is an additional means of diagnosis, and in some instances renders important service. For this purpose various instruments have been devised, the principal difference being in the manner of obtaining the required light for direct observation of the urethral tract. The simplest and most available method for ordinary usage is the head mirror. Instead of a head mirror an electric head lamp with a condenser

has been devised (Fig. 12). Another means of reflecting the light into the urethra is obtained by the Otis urethroscope, in which the reflector and

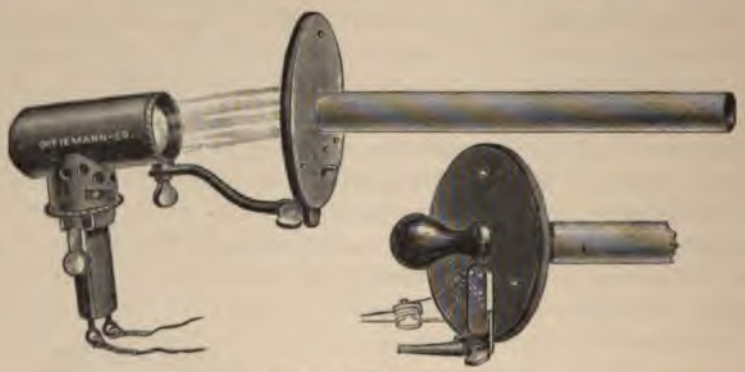


FIG. 13.—Otis Urethroscope.

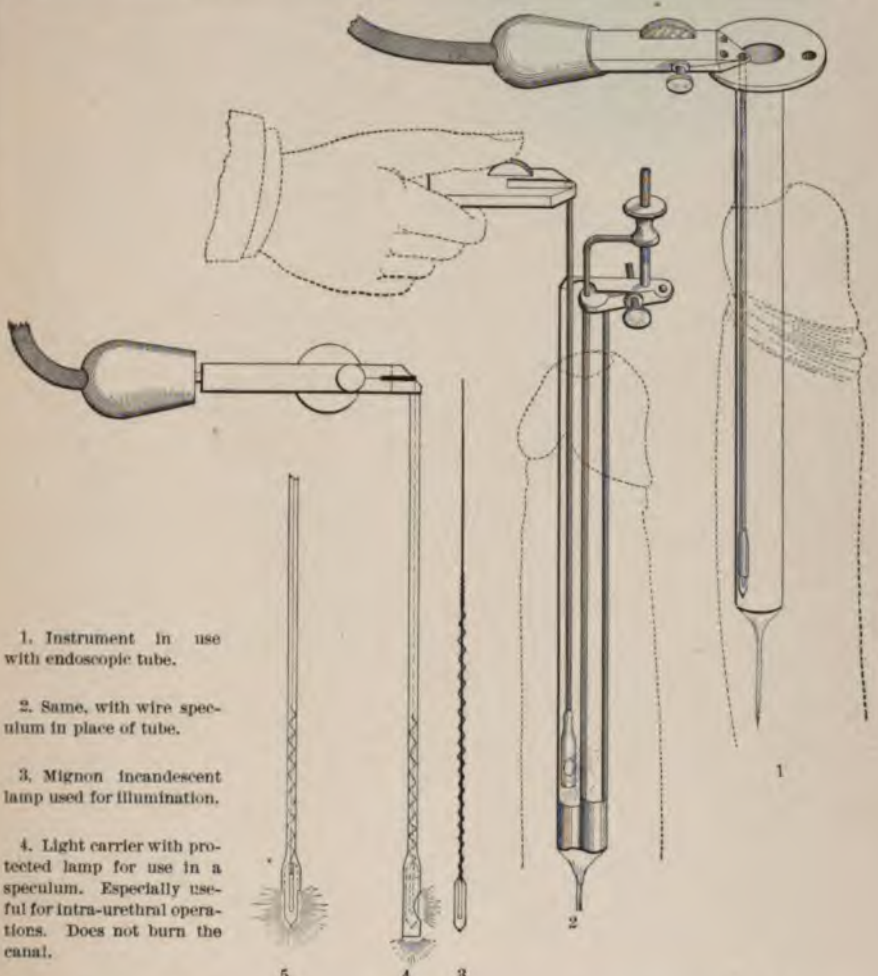
light are connected directly with the endoscopic tube (Fig. 13). The more complicated recent device, the Oberländer-Nitze urethroscope, brings the light within the urethra by the use of a platinum wire, which is heated to incandescence (Fig. 14). This requires the addition of a cooling apparatus

FIG. 14.—Oberländer-Nitze Urethroscope.

to enable the urethra to withstand comfortably the presence of the light and involves the employment of an expensive and complicated attachment. A new urethroscope has recently been devised which is an improvement on previous makes and has the light within the urethra. It is a modification of Kollman's modification of the Oberländer instrument, the prin-

FIG. 15.—Klotz Endoscopic Tube.

cipal feature being that no cooling apparatus is required. For urethroscopic examination we may employ a speculum or an endoscopic tube (Figs. 15, 16, and 17) of a size suitable to the capacity of the urethra (Plate VIII.).




1. Instrument in use with endoscopic tube.

2. Same, with wire speculum in place of tube.

3. Mignon incandescent lamp used for illumination.

4. Light carrier with protected lamp for use in a speculum. Especially useful for intra-urethral operations. Does not burn the canal.

5. Unprotected lamp used with light carrier in endoscopic tube for ordinary urethroscopy.

6. Apparatus complete, with battery. Dimensions, 10 in. × 5½ in. × 2¼ in.

CHETWOOD URETHROSCOPE, FOR DIRECT ILLUMINATION OF THE URETHRA WITHOUT HEAT.

It is possible for the ordinary observer to recognize granulations, papillomata, and erosions in the different portions of the anterior urethra, but it requires the eye of an accomplished and practised worker to interpret the various endoscopic pictures of a less definite and more complex character which are sometimes described, and by an intelligent adoption of the other methods in vogue it will be found that it is only in exceptional cases that urethroscopy is essential to obtain a satisfactory diagnosis.

As already stated, direct examination of the posterior urethra is more difficult and less satisfactory.

When the symptoms of urethritis point toward the existence of inflammation of the prostate gland, digital examination by rectal touch will determine the condition of this organ as well as that of the seminal vesicles. The existence of cystitis in conjunction with urethritis will be recognized by the symptoms and by the examination of the urine. These complications are to be considered in a later chapter.

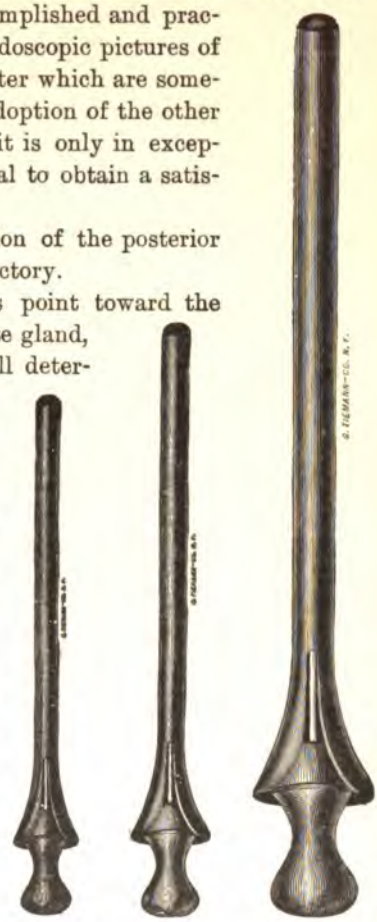


FIG. 16.—Otis Endoscopic Tubes.

**Treatment.** — The treatment of chronic urethritis must be varied according to the nature and character of the malady. In that class of cases in which the inflammation is a direct continuation of recent acute urethritis, all the restrictions as regards the use of stimulants, sexual excitement, etc., are to be enforced as in the acute condition. Indeed its prolongation into the chronic stage is often due to a failure to observe these precautions. As already stated, chronic urethritis may be due to the continued stay of the gonococcus in the urethra,

FIG. 17.—Brown's Urethral Speculum.

to the existence of one of the various complications which occur during the acute stage, to constitutional debility, and sometimes to too long-continued local treatment. That class of cases in which the discharge is very slight, and has existed for a considerable period, is generally more difficult to treat. The cause is apt to be some structural change in the canal itself, or extension of inflammation to the adjacent structures. The treatment of these cases therefore entails the discovery of the underlying cause and its treatment by proper measures. Stricture of the urethra, chronic prostatitis and vesiculitis are common causes, and are considered in a separate chapter.

Finally, those cases which appear as frequent relapses of urethritis from causes which should not affect the healthy urethra, are generally the result of changes wrought in the tissues by the previous inflammation, and more often occur in subjects of a tuberculous, gouty, or rheumatic diathesis. In studying the various forms of chronic urethritis *we must take into consideration* the following elements, which may enter into any given case:

1. The presence of the gonococcus in the urethra.
2. Too long-continued or irritating local treatment.
3. Structural changes in the urethra and extension of inflammation to the neighboring parts.
4. Constitutional debility and diathetic conditions.

A careful analysis of each case should discover one or more of the above causative factors, and determine the course of treatment to be followed. When rigorous local measures have been pursued for a long period without controlling the discharge, often by instituting a simple antiphlogistic *régime*, more favorable results will follow. Under these circumstances, the cessation of local measures and the use of internal medication alone or in conjunction with milder local means should be tried.

When the gonococcus is discovered in the discharge from the urethra local measures to antagonize its presence there should be adopted. Localized morbid conditions in the canal or adjacent structures should be sought out and treated according to the indications. Concomitant constitutional disorders should as far as possible be corrected by rational treatment.

**Internal Treatment.**—The nearer a case of chronic urethritis approaches to the acute form in its character, the more appropriate are those internal remedies referred to in the treatment of the latter malady. Thus when the discharge is more or less free, the use of the oil of sandal wood or of oil of gaultheria alone, or in combination with an alkali, is indicated. The oleoresin of cubebs and the oil of turpentine are suitable for the more chronic and less active forms; ♏ v. to xx. of the former or ♏ v. to x. of the latter may be given three times daily. The oil of eucalyptus is sometimes given with good effect, ♏ v. to x. three times a day. When the posterior urethra or the adjoining portion of the bladder is the seat of trouble,

attention is called to a greater or lesser amount of urinary tenesmus and urgency, which may be present. For this train of symptoms the tincture of hyoscyamus and the fluid extract of corn silk are useful adjuvants; ♏ xv. to xxx. of the former and ʒ ss. to ʒ i. of the latter may be given after each meal in combination with the other remedies. When the urine is highly concentrated and irritating it should be diluted by the free use of diuretic mineral water. The tincture of hyoscyamus and fluid extract of kava kava both have desirable diuretic properties, and may be given for this purpose, exerting at the same time a certain amount of sedative influence upon the posterior urethra. Finally, iron, cod-liver oil, and hypophosphites are to be used when the general health calls for such medication.

FORMULÆ.

℞ Ol. gaultheriæ, . . . . . ℥ ss.
Potass. cit., . . . . . ʒ ij.
Tinct. hyoscyami, . . . . . ʒ vi.
Ext. fld. stigmat. maidis, . . . . . ℥ i.
Syr. acaciæ, . . . . . q.s. ad ℥ iij.
M. S. Teaspoonful t.i.d.

℞ Capsul. ol. terebinth., . . . . . ♏ v.
S. One or two t.i.d.

Or:

Capsul. ol. eucalyptus, . . . . . ♏ v.
S. One or two t.i.d.

Or:

Capsul. ol. santal., . . . . . ♏ x.
S. One or two capsules t.i.d.

℞ Capsul. oleoresin. cubebæ, . . . . . ♏ x.
S. Four to six capsules daily.

℞ Bals. copaibæ,
Ol. gaultheriæ, . . . . . āā ℥ ss.
Liq. potass., . . . . . ʒ iij.
Syr. acaciæ, . . . . . q.s. ad ℥ iij.
M. S. Teaspoonful t.i.d.

℞ Ext. fld. kavæ kavæ,
Ext. fld. stigmat. maidis, . . . . . āā ℥ ij.
M. S. One to two teaspoonfuls t.i.d.

**Local Treatment.**—The statement made concerning internal medication should be repeated here, that the nearer the character of the symptoms of chronic urethritis approaches the acute form the more suitable are those measures employed during the acute stage. Thus when the discharge is free and purulent, the use of irrigations of permanganate of potassium, both to the anterior and posterior urethra, is indicated. The permanganate of potassium and the silver preparations are especially to

be relied upon when the presence of the gonococcus has been demonstrated. Instrumental dilatation of the urethra once or twice a week in connection with the other treatment of chronic urethritis, aside from its employment in stricture of the canal, is at times a desirable measure. Such dilatation opens the follicles of the urethra and expresses their contents, keeps down granulations, and lessens irritability and tendency to spasm. Some urethras rebel against any instrumental interference, and should not be submitted to it except from strict necessity. The smooth steel sound, deftly handled, is the least irritating urethral instrument. The largest size that the meatus will admit should be employed, and no undue force used in its passage. Other dilating instruments have been devised, and are used for the same purposes as the sound. They are constructed so as to be expanded to any size after introduction, the size being indicated on a dial at the handle (p. 133). They are also made to combine dilatation with irrigation. The objection to dilators generally has been that the blades of the instruments which are covered with a soft-rubber hood make a less even distention than the sound and cause more irritation. By having a sound which is tapering in both directions (Fig. 67, page 126), the meatus need not be submitted to the same amount of distention as the lower portion of the canal, while the sound is doing its work at the point where distention is most needed.

Urethral medication is effected by means of *irrigations, instillations, injections, soluble bougies, antiseptic applications, and cupped sounds.*

By means of injections or bougies the patient can, if desired, conduct the local treatment himself when it is confined to the anterior urethra. Injections are by far the more satisfactory.

The other methods mentioned are carried out by the surgeon.

Cupped sounds are intended to be used for the application of ointment to the surface of the urethra, but are not so much in vogue at the present time as they were formerly.

The use of the endoscope is often irritating, and should be confined to those cases in which there exists a well-defined local lesion which can be readily reached, such as a papilloma or ulceration.

It is a mistake to proceed to the treatment of any case of chronic urethritis in a routine manner. A proper analysis of each case will greatly assist in the selection of treatment. The existing lesion should, if possible, be located, and any functional irregularity or constitutional disturbance taken into account.

Many cases of chronic urethritis (anterior or posterior) get well as the result of well-directed local treatment, while others get well when local treatment, which has been too long continued, is stopped. Some patients who are undermined in general health, or the subjects of the tuberculous or scrofulous diathesis, either improve or get entirely well when transplanted to a favorable climate, while those patients in whom the ure-

thritis is due to structural changes in the canal (stricture, etc.) necessarily do not improve unless treatment be directed against the actual lesion.

The use of astringent injections by the patient is sometimes of value in correcting a simple catarrhal condition, and may control the discharge from the anterior urethra. They are also used to supplement the local treatment conducted by the surgeon, or when enforced absence of the patient precludes the adoption of other measures. For this purpose one of the astringent injections given on page 27 may be ordered.

Urethral bougies are cylinders of cacao butter containing some medicament. They are retained in the urethra, and, melting, liberate the drug. In this manner the nitrate of silver, sulphate of copper, sulphate of zinc, iodoform, and numerous other substances have been employed. This form of medication is sometimes a source of irritation and the means of lighting up fresh inflammation, and has nothing to recommend it in preference to the more popular methods in use.

*Irrigations* of permanganate of potassium of mild strength (1 : 8,000 to 1 : 4,000) are best suited to cases in which the discharge is profuse or the urine more or less turbid with pus. Its favorable effects are generally so promptly obvious that when some improvement is not noted soon after a short trial, it may be safely concluded that the permanganate is not what is required, and recourse should be had to other means of relief.

The anterior urethra alone is irrigated when the trouble is confined to this region. The method has been already described (p. 29). When the posterior urethra is the seat of trouble, posterior irrigation is employed, always after previously irrigating the anterior canal, if there be any evidence of trouble in that part.

These irrigations are generally made at intervals of one, two, or three days, according to the amount of pus secreted and the control exercised upon this secretion by the treatment, until a stationary period is reached, as evidenced by the cessation of the discharge and the reduction of the pus in the urine to a minimum quantity. Sometimes no other treatment is required, but a certain amount of inflammation may persist which tends to remain under the permanganate more or less stationary, and may be benefited by the substitution of one of the other local applications, more astringent in action and somewhat more penetrating. At this period instillations are frequently found useful, and in some cases of chronic urethritis prove more effective than the permanganate irrigations from the very beginning of the treatment.

*Instillations* are suitable for both the anterior and posterior urethra. They are employed with the Keyes-Ultzmann or Guyon syringes (Figs. 18 and 19), by means of which small quantities of solutions possessing astringent, antiseptic, and mildly caustic properties are distributed along the course of the canal. The Guyon instrument consists of a flexible gum-elastic catheter with a bulbous end, having a small opening at the

top. A Pravaz syringe is fitted to the catheter, and its contents are ejected drop by drop by turning the piston, which is a screw. The Keyes instrument is solid in one piece, consisting of a silver catheter with fine

FIG. 18.—Keyes' Deep Urethral Syringe.

lumen and proper urethral curve, attached to a small syringe, the piston of which is graduated in minims. The introduction of this latter syringe is seemingly less irritating than that of a bulbous instrument, and permits the application of the liquid to any portion of the canal, whether in the anterior or posterior urethra. When the medicament is intended for the anterior urethra, the syringe may be introduced as far as the sinus of the bulb, and its contents ejected as the instrument is being slowly withdrawn (Fig. 20). The liquid when applied to any portion of the anterior urethra will naturally escape from the meatus, but should be retained by compressing the lips of the meatus for a period of about one minute. When the application is made to the membranous or prostatic portions of the canal, it does not escape upon withdrawal of the instrument, but is retained by the compressor urethræ muscle. To reach the membranous urethra the syringe is passed into the sinus of the bulb and the tip of the instrument, by gentle pressure, is made to penetrate just inside the triangular ligament (Fig. 21). For the prostatic portion it is introduced by downward pressure about three-quarters of an inch farther. Twenty-five to thirty minims of liquid, which is the regular capacity of the Keyes syringe, are generally injected with each instillation. Larger quantities of mild solutions may be introduced by having a syringe with larger barrel

FIG. 19.—Guyon's Syringe.

(ʒ i.–ʒ iss.), but when a very strong solution of silver nitrate is employed much smaller quantities are required, sometimes only a few drops. The bladder should be emptied prior to making an instillation to the posterior urethra, that the neck of the bladder may be also bathed with the injected fluid.

Of the various agents employed for urethral instillation the following are selected as being worthy of special notice: sulphate of thallin, sulphate of copper, nitrate of silver, protargol, ichthyol.

The *sulphate of thallin* is mildly astringent, antiseptic, and in weak solutions somewhat sedative in its action. It has been used in two- to two-and-one-half-per-cent solution as an anterior injection in gonorrhœa, but its employment for this purpose has been practically abandoned. As an instillation to the posterior urethra in solutions of three to twelve per

FIG. 20.—Anterior Urethral Instillation.

cent, its most favorable effect is produced, which in some instances is strikingly satisfactory.

In mild cases of posterior urethritis in which the discharge is slight and mucoid in character, when the deep urethra is hyperæsthetic, stands instrumental interference poorly, and is irritated by the use of other applications, the sulphate of thallin will often prove of decided value. Neuralgic pains, which radiate through the posterior urethra, possibly induced by congestion remaining after the subsidence of a more active condition, will sometimes yield to it. Being about the mildest of all the deep urethral instillations, it is also used to lead up to the stronger applications when they are not at first well tolerated.

This preparation may be conveniently kept on hand in a twelve-per-cent solution, and diluted for use to the desired strength. It should be dispensed in a dark-colored bottle to prevent exposure to the light. The beneficial effect of this remedy is generally obtained by the use of a solu-

tion of from four to twelve per cent. The quantity injected at each sitting may be from ♏ xxx. to cxx. It is seldom irritating, and the urgent desire to urinate experienced in some instances after its use will quickly subside. It is on the whole an excellent agent for extremely sensitive urethras, and will often subdue a hyperæsthetic condition when its use is persisted in.

The *sulphate of copper* is markedly astringent, much more so than the sulphate of thallin. It is somewhat more irritating than this latter substance, although it burns but little in weak solutions. It is also more

FIG. 21.—Posterior Urethral Instillation.

suited to the posterior than the anterior urethra. When the posterior urethra as a result of local congestion or mild catarrhal inflammation is found to be hyperæmic and irritable, such a condition as is usually benefited by the use of astringent applications, a solution of sulphate of copper in increasing strength may be employed before proceeding to the use of nitrate of silver or after the effect of thallin has been exhausted. It may be conveniently kept on hand in a ten-per-cent glycerin solution, which will not precipitate, and the desired strength can be obtained by the addition of water. One grain to the ounce will be found very mild, and the full effect is generally obtained when the strength has been increased up to five or ten grains to the ounce.

The *nitrate of silver* is probably more often used for instillation than

any other substance, and is of great value. It is stronger than any of the previous applications, and even when employed in weak solutions exerts a mild caustic influence, which is a desirable property for granular conditions of the mucous membrane. The general indications for the use of thallin and sulphate of copper apply to nitrate of silver, but although it is more irritating than either of the others, yet it is sometimes better tolerated and more beneficial even to sensitive subjects. Furthermore it has a wider field of utility than either of them, being used also in the anterior urethra with good effect, on account of its bactericidal action. In that form of chronic urethritis which is a direct prolongation of recent acute trouble, in which the permanganate of potassium has been tried and found ineffective, or when this latter remedy has been used and under its influence the improvement has reached a stationary period, the substitution of a mild solution of silver may prove of decided value. Again, when the acute process of a recent urethritis has found its way to the posterior urethra and has become located there, its use will sometimes assist in terminating a condition which had promised to be of long duration. In these latter cases, when well tolerated, it should be used in solutions of progressively increasing strength, beginning with gr. ss. and running up to about gr. x. to the ounce.

*Protargol.*—This substance, which has already been referred to in the consideration of acute urethritis (p. 33), was invented by Eichengrün, and brought to the public notice by Neisser, who, together with others who have experimented with it, have more particularly called attention to its value in acute gonorrhœal urethritis. Later reports by Nogues[1] and Desnos[2] have given an account of their experience with this remedy in the treatment of chronic urethritis, the results of which Desnos thinks show that it has greater value in the chronic than in the acute condition. We agree with him that it is inferior to permanganate of potassium irrigations for gonorrhœa, and believe that its place as a topical application to the urethra belongs among the preparations used for posterior urethral instillation.

Protargol is a proteid silver salt, readily soluble in water, and possesses much less irritating properties than the nitrate of silver, although in solutions stronger than three to four per cent it is apt to excite an intense desire to urinate when deposited in the posterior urethra.

A concentrated solution of protargol makes a somewhat viscid and heavy mixture, and therefore should be used in a syringe with not too small a lumenand with a capacity of from ʒ iss. to ʒ ii., as this quantity is the amount usually injected with each application.

In the anterior urethra protargol has been used in solutions of one-fourth to one per cent, but such mild solutions are of no value in the

[1] Ann. des Mal. des Org. Génito-Urin., June, 1898. [2] *Ibid.*, July, 1898.



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posterior canal. Desnos recommends it in five- to ten-per-cent solutions, and has used it as high as fifteen per cent in chronic urethritis. Its best effect is to be obtained from strong solutions in chronic conditions. We have frequently used it in twenty- and twenty-five-per-cent solutions, and have increased it as high as forty per cent. Such strong solutions are best prepared before each application, and occasion a most intense desire to urinate, sometimes irresistible, and may produce marked symptoms of irritation, which endure for one or two days in many cases, while in some the amount of irritation does not seem to increase relatively with the increased strength of the solutions. Generally speaking, when such strong solutions are well borne, they are likely to produce good results.

The subsequent applications should be at intervals of about forty-eight hours, or even longer, according to the irritation produced, which should be allowed to subside before repeating the treatment.

When improvement is not noted after a reasonable period under the local use of this remedy in increasing strength, it should be abandoned.

In that form of chronic posterior urethritis following closely upon gonorrhœa, its use is sometimes attended with markedly good results, either in connection with the permanganate irrigation of the anterior urethra or after the latter remedy has been discontinued. In this condition it is well to start with a solution of from three to five per cent, and gradually increase as improvement is noted. In other cases of chronic urethritis, of much longer standing, protargol may prove an effective remedy when the trouble is one that involves the mucosa alone, and in some instances success will attend its use when other agents have failed. It may also be employed when the more deep-seated tissues or glandular structures are affected, as an adjuvant to the other treatment adopted. In the treatment of stricture of the urethra by the passage of sounds, it may be used as a topical application to the inflamed mucosa, directly behind the stricture or more properly to a posterior urethral catarrh, which often coexists with stricture of the anterior canal; and again in chronic prostatitis, while it does not reach the substance of the gland, it may be beneficially applied to the surface inflammation, while the deeper structures are attacked by other means.

The use of protargol in weaker solutions, one-fourth to one per cent, for urethro-vesical lavage or irrigation has also been recommended, notably when the discharge is abundant or the urine richly purulent. This may be conducted in the same manner as employed with the permanganate of potassium, and in some cases with beneficial result.

*Ichthyol.*—This preparation is lauded highly by some observers for its soothing and antiphlogistic properties in the urethra. Of its use in acute urethritis we have nothing to say. In the chronic form of this malady it cannot be recommended for the anterior urethra; its results are not equal to those obtained from the other remedies already mentioned. In the

posterior urethra in some cases of a subacute and chronic character good results have been noted after other means had failed, and it is on this account that it is considered worthy of being retained in the list of important topical applications. We find that in cases in which its favorable effect is produced, the strength of the solution can be beneficially increased beyond what has been usually recommended, up to fifteen or even twenty per cent. It is well, however, to commence with a solution of very mild strength, viz., 2 to 3 per cent.

### Topical Applications by Means of the Endoscope.

Even those who are ardent advocates of the general employment of urethroscopy do not urge its use in the posterior urethra where its application is often painful and productive of hemorrhage. With the Ober-

Fig. 22.—Straight Tube for Anterior Urethroscopy. (Oberländer-Nitze.)

länder-Nitze urethroscope (see Fig. 14, page 40) the endoscopic tube is introduced by means of a jointed obturator (Figs. 22 and 23). Those who are skilled in the employment of this method in the posterior urethra in favorable cases are able to make ocular inspection of the prostatic and ejaculatory ducts, the caput gallinaginis, and colliculus seminalis. It is not denied that the use of the endoscopic tube in the posterior urethra, on account of the irritation produced, is contraindicated in acute or subacute posterior urethritis in tuberculous cases and in hypertrophy of the prostate, yet it is claimed that in sexual neuroses and in chronic posterior urethritis it will often be found useful.[1] Even admitting the truth of this claim, there is

Fig. 23.—Jointed Obturator for Posterior Urethroscopy.

nothing to show that the results obtained are in any way superior to those following the simpler and more practical methods already detailed for deep urethral medication.

The therapeutic application of urethroscopy to the anterior urethra is much more practical and sometimes decidedly serviceable. It is not to

[1] "Practical Urethroscopy," Wossidlo, New York Medical Record, September, 1895.

be recommended as a routine method. The different endoscopic tubes and apparatus have already been referred to in speaking of the diagnosis of

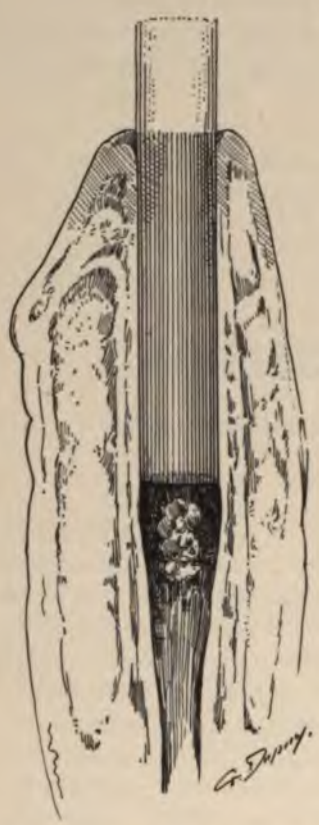

FIG. 24.—Anterior Urethral Polypus.

FIG. 25.—Wire Urethral Snare.

chronic urethritis (see page 39). Any one of these instruments may be employed for the purpose of obtaining an ocular view of a localized lesion in the anterior urethra, and of permitting a direct application to the surface of a diseased area for the removal of granulations, papillomata, or polypi. For the latter purpose may be employed a small wire snare (Fig. 25),

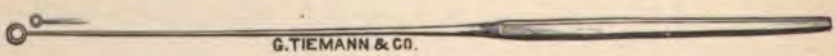


FIG. 26.—Wire Urethral Curette.

the urethral forceps, or a small wire curette (Fig. 26). The topical applications may be made by means of a cotton swab twisted on an applicator. For this purpose the nitrate of silver is commonly used in a

solution of from gr. i. to gr. xxv. to the ounce. If the visual inspection is able to detect the presence of a small abscess in one of the follicles of the urethra, it may be incised through the endoscopic tube by means of a properly constructed knife, such as that of Kollman (Fig. 27), and the sac of the follicle injected by means of a small intra-urethral syringe or pipette (Fig. 28 and Fig. 44, page 70). Such an abscess cavity may be washed out with a mild antiseptic solution, but it is best treated by the introduction of a few drops of the ethereal solution of peroxide of hydrogen, which will cause a rapid

Fig. 27.—Kollman's Urethral Knife.

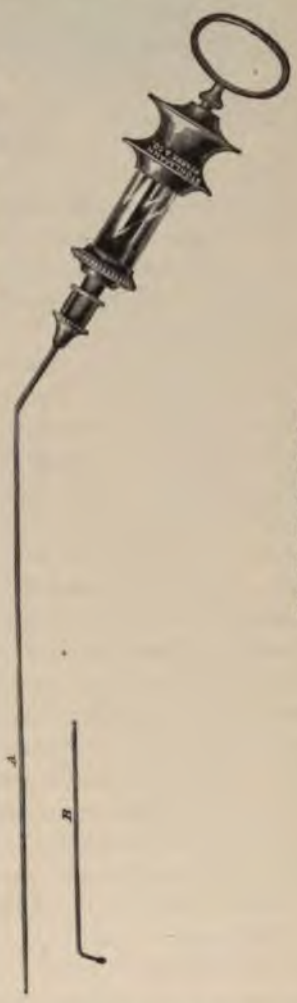


Fig. 28.—Urethral Syringe.

disintegration of the inflammatory tissue and complete closure of the cavity by contraction of the follicular sac.

In concluding this subject we must repeat that this method should be restricted within the lines of special indications, and that its general usage is to be discouraged. Such a practice as the use of daily endoscopic applications to the urethra is not only liable to produce undesirable results upon the urethra, but must gain for the physician the far from enviable reputation of being a potterer.

# CHAPTER III.

## BALANITIS AND POSTHITIS—HERPES PROGENITALIS—VENEREAL WARTS.

BALANITIS signifies inflammation of the surface of the glans penis, posthitis inflammation of the prepuce, generally of its internal mucous lining. As these two conditions often coexist, the term balano-posthitis is employed. A long foreskin with small orifice predisposes to this disorder, and the irritation due to retained smegma, urethral discharge, or other irritating fluid acts as an exciting cause. This condition is a common complication of gonorrhœa.

In a mild form it amounts only to a bright redness and moisture of the mucous membrane, surrounding the glans and foreskin with a certain amount of creamy secretion of sharp, offensive odor, and accompanied by a constant itching or burning of the parts. In a more advanced form the mucous surface may become covered with excoriations. The whole substance of the prepuce may be swollen and reddened, even sufficiently inflamed if the preputial orifice be narrow to occasion inflammatory phimosis. The excoriations result from the loss of epithelium in irregular patches, but when the irritation persists they go on to form ulcerations superficial in character, more rarely deep, simulating closely the appearance of chancroids. An irregular form of balanitis occurs, called[1] "circinate," which appears in concentric patches resembling ringworm of the skin, said to be due to a special organism and of venereal origin.

Chronic balano-posthitis occurs in men past the middle age, generally in those with a tight and pendulous foreskin. The inflammation is mild in character, and as it extends over a long period produces a great deal of thickening of the mucous surface of the prepuce, which, when retracted, is found to be covered with granular prominences or superficial excoriations. Sometimes the prepuce is so much thickened around the orifice that retraction is impossible. A continuation of this process results in contraction of the infiltrated layer of epithelial and submucous tissue that has been deposited and a corresponding decrease in the normal size of the glans penis.

The complications of balano-posthitis are phimosis, paraphimosis, vegetations, lymphangitis, inguinal adenitis, gangrene. Phimosis is the direct result of inflammatory swelling. Paraphimosis is due to thicken-

[1] Taylor: "Venereal Diseases." Berdall and Battaile: La Médecine moderne, 1891-1892, and Annal. des Malad. des Organes gén.-urin., vol. viii., 1890.

ing of a retracted foreskin. Lymphangitis when present is similar to that which occurs with chancroids of the penis (see p. 192). Inguinal adenitis sometimes accompanies lymphangitis as a complication of balanitis, and resembles the same condition occurring in connection with chancroids. Vegetations or pointed condylomata sometimes complicate a balano-posthitis as a result of the same causes that produced the latter trouble. Gangrene of the constricted prepuce may result from excessive swelling of the parts, the sloughing of the tissue included in the constricted area entailing ultimate deformity due to cicatricial contraction. This complication is more apt to occur in debilitated and cachectic individuals.

The **diagnosis** of balanitis is simple in most cases, but it may be confounded with herpes, chancroid, or gonorrhœa. When the inflammation runs high, and perhaps exulceration exists upon the foreskin, it is difficult to distinguish balanitis from herpes. In the early stage the outline of herpetic vesicles may be recognized.

Chancroid is more apt to be confounded with severe balanitis, complicated by deep ulcerations. The course of the inflammation is much more severe and rapid in chancroid. Lymphangitis and adenitis are quite common, while in simple balano-posthitis they are less apt to be present, except in poorly nourished and debilitated individuals.

In subpreputial chancre or chancroid, when the foreskin does not pull back, the diagnosis remains doubtful until the preputial cavity can be inspected or other signs clear up the doubt. When there is a copious flow of pus, if there be phimosis, balanitis may be mistaken for acute gonorrhœa. This question is settled by the examination of the discharge for the gonococcus, and by determining whether or not the flow exudes from the meatus or is derived from the cavity of the prepuce.

**Treatment.**—When the prepuce can be retracted, mild balanitis may be speedily relieved by the exercise of cleanliness and the use of a mild disinfectant or astringent lotion. For this purpose may be used the following:

| | | |
|---|---|---|
| ℞ | Acid. boric., | ʒ ss. |
| | Zinc. sulphocarbolat., | gr. i. |
| | Aquæ, | ℥ iv. |

| | | |
|---|---|---|
| ℞ | Zinc. sulphat., | |
| | Thymol., | āā gr. i. |
| | Acid. boric., | ʒ i. |
| | Spirit. lavand. comp., | ʒ ij. |
| | Aquæ, | q.s. ad ℥ iv. |

| | | |
|---|---|---|
| ℞ | Vini aromatic., | ʒ iv. |
| | Aquæ, | ℥ i. |

M.

| | | |
|---|---|---|
| ℞ | Liquor plumbi subacetatis, | ʒ i. |
| | Aquæ, | ℥ iv. |

A piece of absorbent cotton or a strip of thin old cotton cloth, moistened in one of the above lotions, is laid around the glans and the prepuce pulled forward to its natural position. This prevents friction and absorbs the irritating discharge. Dressings should be repeated several times a day. Sometimes a dry dressing acts better than a moist one, especially when erosions or ulcerations exist. Under these circumstances the discharge should be frequently removed and the glans and prepuce carefully washed with a mild disinfectant solution (corrosive sublimate 1 : 6,000 or 8,000) after which the parts should be dried with absorbent cotton and the surface dusted with bismuth, perhaps containing a little boric acid or calomel, or with eudoxin. The combination known as dolomol tar we have found a useful and unirritating dusting-powder. In chronic cases and when the ulcerations persist in spite of the soothing form of treatment, the application of a solution of nitrate of silver, gr. x.–xxx. to the ounce, by means of a camel's-hair brush may assist in bringing about a more rapid cure. When the prepuce cannot be retracted, its cul-de-sac must be cleansed thoroughly with hot water, and one of the above lotions by means of a duck-bill syringe (Fig. 11, page 36). This should be done frequently during the day, as often as the discharge reaccumulates. If the parts are generally swollen, a wet dressing of Thiersch's or mild sublimate solution should be employed in addition to the other measures. If by the adoption of such means improvement is deferred, or if the inflammation is so intense that sloughing of the prepuce be threatened, it is better to relieve tension by slitting up the dorsum of the foreskin. If upon exposure of the region behind the glans chancroid is discovered, its treatment should be conducted in accordance with the instructions laid down in the section on chancroidal phimosis (p. 186). In all chronic cases of balanitis with phimosis and thickening of the mucous membrane circumcision affords proper means of relief, and should be resorted to. Lotions and astringent injections in these cases afford little relief, as relapses are liable to recur continually.

## Herpes Progenitalis.

Herpetic vesicles, single or multiple, appear upon the mucous membrane covering the glans and prepuce and upon the cutaneous envelope of the penis. They may be located in the sulcus, behind the corona, in the folds of the frenum on either side, around or inside the meatus, or on any portion of the integument. When occurring upon the skin the vesicles dry down and form scabs, but when situated upon the mucous lining they run a different course owing to the rupture of the vesicle, which takes place early, leaving a more or less superficial exulceration. In the case of a single vesicle this is irregularly round, but when several vesicles lie close together they may become fused into a single patch of

irregular outline. The symptoms attending this lesion are burning or itching of the surface implicated, and a certain amount of watery secretion, which, when allowed to collect, becomes purulent. Subpreputial herpes, after the vesicles break, may run on into balano-posthitis if the secretion be allowed to accumulate. When the ulcerations become unusually deep as the result of neglect of treatment or constitutional debility, and are accompanied by inguinal adenitis, the sores may be confounded with chancroidal ulceration. In reaching a **diagnosis** it should be remembered that the herpetic condition starts in vesicles, generally in clusters which precede the appearance of ulceration, and that bubo is uncommon. Differential diagnosis is sometimes difficult, but a decision may be promptly and surely reached by auto-inoculation. The pus of ulcerated herpes will not produce the typical ulcer which surely follows the auto-inoculation of chancroidal pus. The duration of herpes when uncomplicated is from three or four days to a fortnight.

The causes of herpes are local irritation and diathetic predisposition. Uncleanliness, the decomposition of sebaceous material, especially when the prepuce is long and contracted, and the friction of intercourse may be cited. Full-blooded, gouty, rheumatic, and neurotic individuals seem to possess a predisposition to the affection. If, as has been held by one or two observers, it is of special microbic origin, sufficient evidence has not been produced to sustain the claim. Sometimes herpes progenitalis is attended by rather pronounced neuralgic pain—a feature which may be marked in any kind of herpes, reaching its highest expression in herpes zoster. This rather exceptional accompanying symptom has led a few authors to the extremity of erecting a new sub-variety of herpes, which they call *neuralgic.*

**Treatment.**—For cutaneous herpes prevent the vesicles from breaking by covering the patch with collodion, and keep it covered until it is well. If the vesicles break, dust them with bismuth or eudoxin. On the mucous surface touch the vesicles twice daily with eucalyptol and dust with bismuth or eudoxin when they break. After excoriations occur the treatment is generally the same as for balanitis, requiring that the irritating discharge should be removed and the parts cleansed and maintained in this condition by suitable disinfectant lotions. As indicated in the previous section on balanitis, after using the lotion the parts should be thoroughly dried and a mild dusting-powder applied—bismuth, zinc, starch, and lycopodium. The dolomel and tar or eudoxin will be found especially efficacious. Eudoxin is the bismuth salt of nosophen, the latter being a compound rich in iodine and an iodoform substitute. Underlying constitutional conditions should be attended to. In chronic and relapsing herpes, in cases accompanied by sharp neuralgic pains, and in those showing a tendency to persistent ulceration, it is necessary to alter the surface by a caustic, for which purpose may be employed carbolic acid,

a ten-per-cent solution of nitrate of silver, or antiseptic pyrozone. When a long, tight prepuce is the predisposing cause, circumcision is the natural remedy.

### Venereal Warts.

Vegetations, condylomata, or venereal warts, as they are commonly called, spring up readily in both sexes about the genitals if acrid and irritating discharges be retained until they have had time to decompose. Pathologically they consist of highly vascular papillary outgrowths, composed of an increase of the epithelial and connective tissue. They are not necessarily of venereal origin, but are common under a tight prepuce in connection with gonorrhœa, and often found complicating balanitis when there is no urethral inflammation. Those that occur upon the mucous membrane are soft and yielding in character; upon the integument they are harder. When dry they resemble ordinary seed warts, and are composed of pointed epithelial prominences which grow up into a raspberry-like mass, varying from the size of a pinhead to that of a hickory nut. They may spread out as a dry velvety growth over a large surface. The soft warts are commonly situated behind the corona glandis on either side of the frenum, but may be encountered on any portion of the mucous surface of the prepuce. They are sometimes found in the mouth of and deep in the urethra, and are distributed also over the scrotum and frequently around the anus. They may be scattered in irregular collections in one or more of these sites, or may be so abundantly gathered upon the glans penis as completely to bury it, giving a cauliflower-like appearance, with the glans almost hidden from view; or if the prepuce be long, the extensive outgrowth may emerge through the orifice, or, on account of a tight phimosis and consequent subpreputial pressure, may produce gangrene and perforation of the prepuce.

The inflammation due to these excrescences and their irritating discharge may result in a balano posthitis and inflammatory phimosis.

Paraphimosis may also come on during a retraction of the prepuce on account of the hyperplastic inflammatory condition of the tissues due to their presence.

The contagiousness of venereal warts has been maintained by some writers, but this question is still unsettled.

The **diagnosis** of these growths is self-evident. They should not be confounded with "condylomata lata," which are of specific origin and generally accompanied by a clear syphilitic history. Such an error can be made only when the vegetations or warts have existed for a long time and have undergone changes which have resulted in their becoming more dense with pronounced flattening of the surfaces. Epithelioma at the beginning of its course may be mistaken for condylomata. The former appears late in life and is accompanied by infiltration of the adjacent tissues

and enlargement of the nearest chain of glands. In a case of doubt, in which the suspicion has been raised, microscopic examination will decide.

**Treatment.**—The prophylaxis against these warty excrescences is cleanliness, especially in the event of balanitis or gonorrhœa. When warts are encountered in cases in which the foreskin can be retracted, they may be removed with scissors and their bases cauterized with nitric acid or caustic pyrozone, having previously anæsthetized the surface with cocaine. When the growths cover an extensive area they may be thoroughly scraped away by means of a sharp curette and the denuded surface cauterized with acid and treated with a dry dusting-powder composed of calomel, oxide of zinc and bismuth, or eudoxin, the bismuth salt of nosophen, an iodine compound and an iodoform substitute.

A most satisfactory way to treat these warts is to apply—

℞ Acid. salicylic., . . . . . gr. l.
Acid. acetic., . . . . . ℥ i.

This combination forms a curd-like mixture which generally will remove warts of all sizes upon the foreskin and prepuce, leaving a smooth surface within twelve or twenty-four hours. In using this preparation a sufficient quantity of the dregs of the mixture should be deposited upon the growths to cover their entire surface, and be allowed to dry. One application is generally sufficient.

When vegetations occur within a phimosed foreskin, it may be necessary to slit or cut away the latter.

**Phimosis, Paraphimosis, Circumcision.**—Phimosis is said to exist when the orifice of the prepuce is too small to allow the glans penis to be uncovered. It may occur congenitally, but is also acquired as a complication during an attack of balano-posthitis, either alone or in combination with the presence of herpes, vegetations, or chancroid.

This condition exists in various degrees as a congenital formation, producing a contracted orifice, which may simply prevent retraction of the foreskin or may be so tight as to impede the flow of urine. Such an extreme condition will naturally favor the occurrence of balanitis, and interfere with the proper treatment of the morbid conditions which attack the interior of the prepuce.

*Inflammatory phimosis* is a transient trouble due to inflammation of the prepuce. It may leave behind a true phimosis as a result of chronic thickening. The treatment of inflammatory phimosis consists in treating the cause which underlies it; in addition evaporating lotions in the form of wet dressing may be applied, while the cavity of the prepuce is kept continually washed with an antiseptic solution composed of carbolic acid, 1:50, or corrosive sublimate, 1 : 5,000. It is better not to incise an inflammatory phimosis unless the condition inside the prepuce demands it. When such is the case the operation should be performed by making

two lateral incisions, and completing the circumcision when the inflammatory condition and local lesions have yielded to treatment.

FIG. 29.

*Paraphimosis* is the condition which exists when the prepuce gets behind the corona glandis and cannot be replaced. Occurring with gonorrhœa it is caused by œdema of the retracted foreskin. Such inflammatory paraphimosis may depend also upon balanitis, herpes, chancroid, or chancre. The glans penis in paraphimosis is swollen and livid. When seen early there may be little inflammation of the glans or prepuce, but when the condition continues and is unrelieved, inflammation may reach a high degree, œdema of the prepuce becomes very extensive, the constricting portion behind the corona appears like a cartilaginous ring, and the glans penis may even become gangrenous from strangulation.

FIG. 30.

Sometimes, although the foreskin is not long enough to cover the glans, œdema may occur, giving the same appearance as in the case of paraphimosis with contracted and long prepuce. Under these circumstances the deeper parts are not strangulated, and there is no occasion to attempt reduction.

The treatment of paraphimosis varies with the presence or absence of strangulation. When there is no strangulation, the indication is to endeavor to allay the inflammation by the use of wet dressings or fomentations. In some mild cases the application of a few coats of contractile

FIG. 31.

collodion over the smooth mucous membrane will control the tendency to increasing œdema and may cause its disappearance. Should positive strangulation of the penis occur, as evidenced by the bluish-black color of the glans, which becomes turgid and swollen, cold and devoid of sensibility, reduction of the strangulation is imperative. This may be done in several ways. One way is to encircle the penis with one hand (Figs. 29 and 30), or with the thumb and index finger of one hand, using the other one to knead and compress the glans and push it back through the constricted ring of the prepuce. Another is to grasp the penis behind the constricted portion between the index and middle fingers of both hands, making pressure with the thumbs on either side of the glans and at the same time pulling the strictured prepuce forward, the purpose being to make the glans as small as possible and to draw the constriction over it rather than to push the glans through the stricture (Fig. 31). Still another method is to compress the swollen glans by means of a one-half-inch muslin or rubber

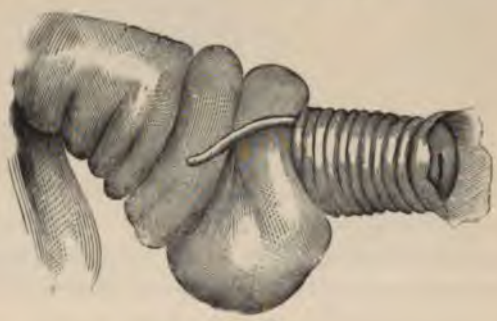

FIG. 32.

bandage, applying it from apex to base, and then endeavor to retract the prepuce forward with the bandage in place by one of the manipulations, or to remove the bandage and immediately attempt reduction before the engorgement has had time to return to the same extent (Fig. 32). Finally by means of the introduction of hair-pins, one on either side of the glans, beneath the constriction, to act as directors, success may be accomplished when the other methods have failed (Fig. 33). When the prolonged and careful attempts at reduction fail, the stricture behind must be divided

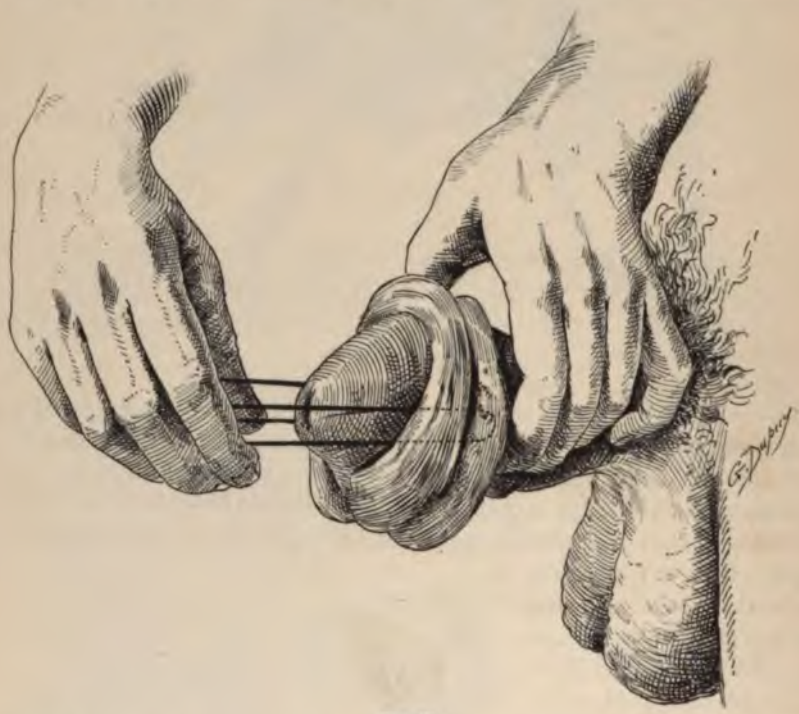

FIG. 33.

with the knife. To accomplish this a blunt tenotomy knife is introduced on its flat surface beneath the stricture, and is made to cut outward, or the incision may be made directly down upon the sheath of the penis. Sometimes the inflammatory infiltration of the tissues necessitates the division of the stricture at several points.

**Circumcision.**—To expose the glans penis it is sufficient to make one long incision upon the dorsum of the prepuce, including both layers, from the orifice to the base of the corona, and after trimming off the corners to unite the two layers on either side. When the prepuce is very tight, a grooved director may be passed from the orifice to the corona, in the middle line. A short, pointed bistoury is then run along the groove, which transfixes the skin and incises the entire prepuce. This operation

leaves two clumsy dog's ear flaps, but is much simpler than complete circumcision. Taylor strongly recommends instead of the dorsal incision that two lateral cuts be made, and contends that the dorsal incision is

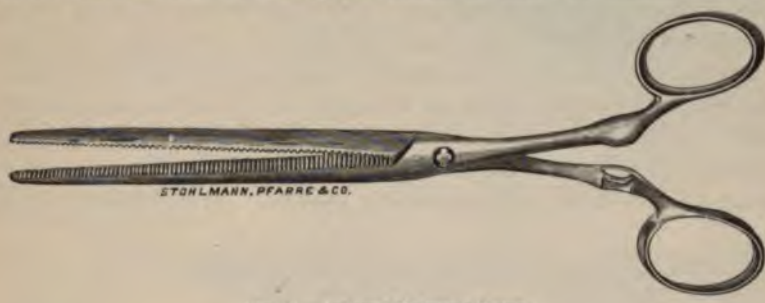


FIG. 34.—Authors' Phimosis Clamp.

unsatisfactory in that it does not always produce the desired relief and renders the parts less accessible than by the lateral cuts.

Circumcision proper is a simple operation which is performed for the purpose of removing the orifice of a tight prepuce and all redundant tissue. The operation is as follows: Wash the outside of the foreskin, and,

FIG. 35.—Circumcision I. Showing aniline line to mark incision.

if possible, the inside as well. In children general anæsthesia should be employed. In adults local cocaine or eucaine anæsthesia suffices unless the operation is to be complicated and prolonged. The prepuce is caught at its orifice and drawn forward, not rolled upon itself, and a clamp applied in an oblique direction—that is to say, the general direc-

tion of the corona—at the point corresponding to a line previously drawn on the integument parallel to and somewhat in front of the corona, while the foreskin was in its normal position. The cavity of the prepuce should be injected full of an eight- or ten-per-cent solution of cocaine, which should be retained for at least five minutes. The line of the incision through the integument can be completely anæsthetized by infiltration with cocaine. For this purpose a two-per-cent solution is used, after which, if one wishes a neat operation, the base of the penis may be constricted with a rubber tube or catheter, the ends of which are fastened in place by a bit of tape or a hæmostatic forceps. As the relation of the

FIG. 36.—Circumcision II. Showing clamp applied to foreskin.

parts is somewhat disturbed by these preliminary steps, it is a good plan to mark the line of the incision upon the integument with an aniline pencil before doing anything else (Fig. 35). The phimosis clamp is now applied and with a sharp bistoury or scissors the prepuce is cut away beyond the blades (Fig. 36). After removal of the forceps retraction of the integument occurs, and the mucous membrane is left, covering the glans (Fig. 37). This should be slit down upon the dorsum or laterally (Fig. 38) about one-quarter inch from the corona, peeled or dissected from the glans if there be adhesions, and trimmed away on either side, leaving about one-fourth of an inch to hold the sutures. As many bleeding points as can be controlled by torsion should be treated in this way, and ligatures applied only where necessary. Blood clots should be scratched away with the nail and any little oozing vessel twisted. If in spite of the oval opening of the oblique incision the newly made orifice appears too tight, a liber-

ating incision should be made down the back of the penis for one-fourth of an inch. The mucous membrane must be liberated so as to leave the

FIG. 37.—Circumcision III. After removal of clamp.

entire corona clean. The best material for ligature is rather coarse horse-hair. Catgut is not suitable. It makes a large suture hole, and is liable to give way during erection. It is better than silk because it does

FIG. 38.—Circumcision IV. Showing mucous membrane after lateral incision and before it is trimmed.

not have to be removed, but horse-hair, if properly placed very close to the margin of the integument and of the mucous membrane, does not have to be taken out, as in the course of a few days, if the first knot be tied tightly, it always cuts through the suture hole and comes away with the little brown serous scab, leaving a perfect line of union. Erections make no difference in the healing if the dorsal slit is made. This leaves a loose suture line. As many as twenty or twenty-five sutures may be applied, the first one being placed at the raphé and the second one in the centre of the dorsum, and then as many more on either side between these points as may be necessary to obtain close apposition of the wound surfaces. To prevent the horse-hair ends from turning in and their points

FIG. 39.—Circumcision V. Operation completed. Horse-hair sutures.

irritating the glans (since in many cases a little œdema occurs causing the suture line to roll inward), the ends of the hairs should be left about one inch long (Fig. 39). After forty-eight hours they should all be trimmed down close to the serous scab, which will have formed. When the scab falls spontaneously, the sutures will come away unnoticed in it, leaving a dry line of union. In children this is a valuable feature of the operation, because the little patients do not like to have the wound dressed or touched in any way. The operation being completed the parts are washed, and the line of incision is dusted with a little astringent antiseptic powder, such as nosophen or aristol. No bandage or dressing of any kind is required. It is hard to keep in place, only irritates, and is absolutely unnecessary. A contrivance in the shape of a circular roll, made

of an ordinary towel, should be placed about the penis, that the member may lie sideways against it. This is to be tied to the body with four tapes, one around each thigh and two to a waistband, for the purpose of

FIG. 40.

keeping the bed-clothes from contact with the penis (Fig. 40). It is a most exceptional occurrence in simple cases not to obtain complete union, but if from any cause a granulating surface is left, it should be treated with a dusting-powder or stimulating applications.

# CHAPTER IV.

## INFLAMMATION OF URETHRAL FOLLICLES — PERI-URETHRAL ABSCESS — COWPERITIS — PROSTATITIS — SEMINAL VESICULITIS.

THE common complications of urethritis beyond those already considered—chordee, balanitis, etc.—consist of inflammation of the glands of the urethra, folliculitis, peri-urethritis, cystitis, prostatitis, and epididymitis, which occur in connection with the chronic as well as the acute form of the disease.

**Inflammation of the Urethral Follicles.**—The follicles of the urethra always participate more or less in all acute inflammations of the canal.

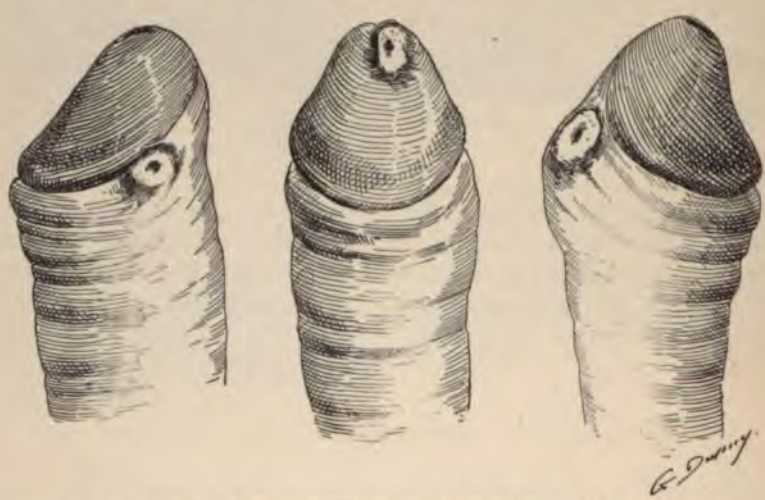

FIG. 41.—Follicular Abscess Complicating Urethritis in Different Locations.

In chordee the follicles at the affected spot are certainly involved, and may be the route by which the inflammation reaches the deeper tissues. These mild inflammations get well spontaneously, as a rule, when the surface congestion goes down.

The cause of follicular inflammation of the urethra is found in some form of local irritation to the already congested canal or during an attack of urethritis, such as irritating injections, frequent erections, nocturnal emissions, etc. When a single follicle or a group of follicles is attacked by an extension of inflammation, each one may be felt under the skin, generally on the floor of the urethra, like a small shot or pea. When

the follicular mouth becomes closed during the course of such an inflammation, an abscess is formed in the dilated sac of the follicle, which eventually discharges itself externally through the skin, or internally through the natural duct of the follicle (Fig. 41). When an external opening occurs, urethral fistula may be the ultimate result. A favorite site of these follicular abscesses is behind the meatus in the fossa navicularis, on one or both sides of the frenum. The inflammation, if unabated, may extend from these follicles into the cellular tissue, *peri-urethral inflammation* (Fig. 42). When a cellular inflammation occurs, the outline of the follicle is generally lost, a phlegmon is formed which is not likely to undergo resolution, but discharges itself either externally or internally, or both. In the latter instance, as in the case of a follicular abscess, a urethral fistula may result.

FIG. 42.—Peri-Urethral Abscess Involving Follicles on the Floor of the Urethra.

**Treatment.**—At the onset the treatment of follicular and peri-urethral inflammation should be antiphlogistic—rest, freedom from all local irritation, and mild antiseptics, if any local measures be adopted. Irritating injections should be positively avoided. If irrigations of permanganate of potassium are being used, they may be continued under light pressure in mild strength (1 : 6000). The external application of ten to twenty per cent of ichthyol ointment is sometimes useful.

When suppuration occurs and the abscess points externally, an incision through the skin should be made to evacuate the pus, except when the follicular abscess presents near the meatus and can be reached from the interior (Fig. 43). In this instance an internal incision should be made and the abscess treated on the inside, thereby often preventing the formation of a urethral fistula.

FIG. 43.—Follicular Abscess in the Fossa Navicularis. Preparation for incision through meatus.

A most satisfactory mode of treating these abscesses after they have discharged, whether externally or internally, is by the injection into the cavity of a small quantity of the ethereal solution of peroxide of hydrogen (pyrozone), commencing with twenty-five-per-cent (caustic) solution so as to destroy the unhealthy tissue and continuing with the same strength, or with the weaker five-per-cent (antiseptic) solution at intervals of one or two days between each application. By this method a rapid contraction and closure of the sac is produced and the danger of fistula may be avoided. These solutions are applied by means of a pipette, which is drawn to a very fine point (Fig. 44).

Other methods of treating these abscesses are based upon general surgical principles of antisepsis and drainage, which require that after the

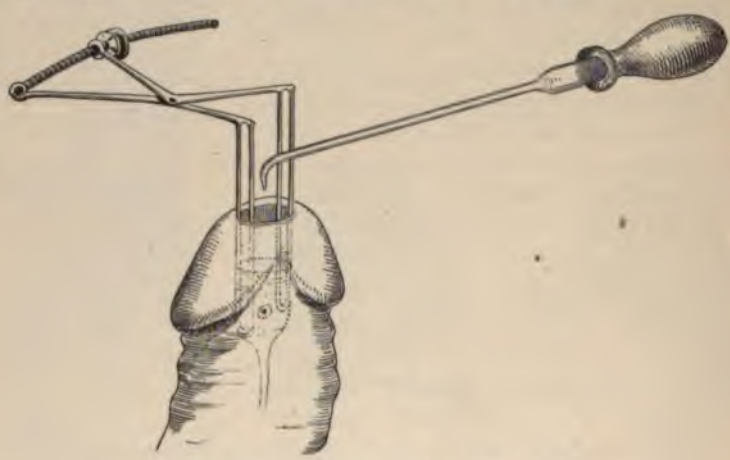

FIG. 44.—Treatment of Follicular Abscess from Interior.

abscess is opened it should be washed at regular intervals with antiseptic solution, and made to heal from the bottom by packing with gauze.

**Inflammation of Cowper's Glands.**—This is another form of follicular inflammation of the urethra which occurs in the glands of the bulbous portion known as Cowper's glands, *cowperitis* and *peri-cowperitis*. The causes are much the same as in follicular inflammation in other portions of the urethra, some kind of direct local irritation or traumatism during an attack of urethritis, generally gonorrhœal.

The primary symptom of this complication is pain in the perineal region, which when occurring during the acute stage of urethritis should always suggest the possibility of inflammation in one of these glands. Examination reveals a painful and indurated swelling in the perineum, corresponding to the locality of Cowper's glands, generally on one side only. It is important to recognize this condition at its onset, as in the majority of instances, when discovered early enough, resolution may be

brought about by antiphlogistic measures. When this latter course is not taken, suppuration occurs, characterized by the enlargement of the swelling in a more or less oval shape, somewhat pointed toward the anal region. The swelling later diffuses itself into the surrounding tissues, *pericowperitis*, and extends forward in front of the scrotum (Fig. 45). The surface of the skin reddens, the tumor softens, having in some cases reached the size of a hen's egg.

When suppuration occurs, the abscess may open both into the urethra and through the perineum, and is liable to leave urethro-perineal fistula. More often, however, the tumor resolves without suppuration, especially if recognized early and properly treated.

Certain cases that have suppurated and discharged in one or both directions, notably if not well treated or if the general health be undermined, terminate in chronic cowperitis with internal or external fistula, or both, a very obstinate and annoying malady. If there be complete urethro-perineal fistula it may permit leakage during urination, or the size of the fistula may be too small to allow the passage of a visible quantity of urine and be only demonstrable by injection.

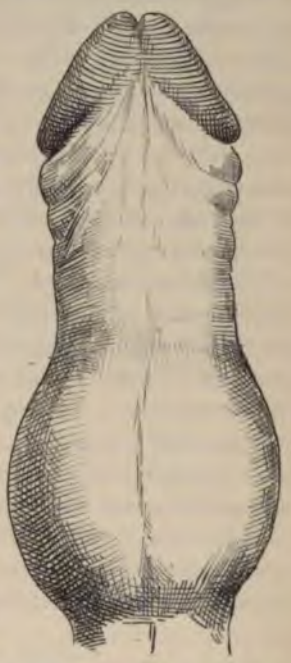

FIG. 45.—Cowperitis. Peri-urethral abscess beginning in Cowper's glands and extending to the peno-scrotal angle.

There are no **symptoms** peculiar to cowperitis beyond those of pain, swelling, induration, and suppuration corresponding to the anatomical situation of Cowper's glands, occurring during the course of acute urethritis. The diagnosis therefore based upon these symptoms is not difficult. When recognized early it should not be confounded with perineal inflammation or urinary infiltration. Its location should differentiate it. When there is a general peri-cowperitis its recognition is more difficult, and a distinction between it and urinary infiltration from the urethra may be troublesome, but the latter is usually a result of tight stricture or of old chronic inflammation of long standing.

While malignant disease and tubercle do occur in this region, they have been very seldom observed. In distinguishing either one of these conditions it should be borne in mind that the course and duration of acute cowperitis are rapid and short, generally not lasting over five or six days, while both tubercle and cancer are essentially chronic in character. Generally speaking, a chronic cowperitis which persistently resists treatment should lead to the supposition of the existence of underlying tuber-

cle, and calls for careful bacteriological examination of the pus and fistulous scrapings.

**Treatment.**—As already stated, it is most important to recognize cowperitis at its inception, during which period antiphlogistic measures are indicated, poultices, baths, and if the inflammation be sufficiently intense, the application of leeches to the perineum. Absolute rest should be enjoined and all direct urethral applications discontinued. As soon as suppuration becomes evident it is necessary to evacuate the pus, and for this purpose a free incision should be made over the most prominent point of the swelling. The abscess should be washed out with an antiseptic solution and the cavity packed lightly with gauze, for the purpose of encouraging rapid contraction and healing from the bottom toward the surface. As soon as cicatrization commences, and even before the cavity has contracted completely, the same method suggested for the treatment of follicular abscess of the urethra is to be recommended here—namely, the injection of the ethereal solutions of peroxide of hydrogen (pyrozone), at first every day and later every second or third day, in the hope of causing a complete closure of the fistulous tract. At the beginning of this treatment, when the surface to be treated is large, it is well to begin with the five-per-cent solution of this preparation, and when the cavity has contracted down to a fistulous canal the twenty-five-per-cent caustic solution may be resorted to with good effect. In many instances this treatment may result in the complete closure of the fistula. When these means fail, the alternative is the complete extirpation of the fistulous tract and of the indurated mass of glandular tissue.

## Acute and Chronic Prostatitis.

**Prostatitis.**—Etiology: Acute prostatitis is quite often a complication of gonorrhœa, but it also attends non-specific urethritis, notably when stricture is present, and it may occur in connection with sexual strain, masturbation, pre-existent prostatic disease, tubercle, cancer, or from traumatism.

The rheumatic, scrofulous, and tuberculous diatheses are predisposing causes, while sexual excitement, alcoholic excess, over-exercise, and traumatism—especially instrumental—during an attack of urethritis, may be the determining factors in its production.

**Follicular Prostatitis.**—Mild prostatitis is a common complication of acute urethritis after it has invaded the posterior urethra. Confined mostly to the surface and to the follicles of this portion of the urethra, it is not, when properly treated, of long duration. The prostatic urethra becomes congested and swollen. Granulations may form on the surface of the mucous membrane. The superficial follicles of the prostate may become engorged, and their mouths dilated with contained pus, which may exude and give rise to a purulent discharge.

The symptoms consist of a somewhat urgent and frequent desire to urinate, which varies more or less according to the intensity of the inflammation. The desire to urinate may persist after the bladder has been emptied, and there is likely to be pain at the end of the urinary act. The coexistence of a certain amount of urethro-cystitis or inflammation of the neck of the bladder is more than likely. The above symptoms resemble closely those of the latter disorder. Besides the presence of a certain amount of urethral discharge, the urine is purulent and the presence of pus from the posterior urethra may be demonstrated by washing out the forward canal before the urine is voided. Sometimes a few drops of blood trickle away after the urinary act.

**Parenchymatous Prostatitis.**—The foregoing description refers to a mild type of prostatitis. A higher grade of the malady involves the parenchyma of the organ, and may or may not result in prostatic abscess and periprostatitis.

When prostatitis attacks the body of the gland, the latter becomes increased several times its normal size; its consistence is firm and resistant; the tissues are engorged with blood and distended with an exudation which is at first serous and later of a purulent character. Sometimes one half of the gland is more enlarged than the other, and sometimes lumps and nodes are felt upon the surface on account of irregular distribution of the inflammatory process. The gland throbs when palpated by rectal touch.

**Abscess of the prostate** occurs as a result of the formation of multiple pus foci, which are distributed throughout the glandular structure and later unite into one pus sac of variable size, which is generally located in the posterior portion of the lateral lobes. More rarely small hemorrhagic infarctions occur in the gland, varying in size from a small pearl to that of a pea, which become the point of departure of the prostatic abscess (Desnos).

In the early stage these small pus collections are separated by thick and resisting walls. Sometimes they are seated beneath the urethral mucous membrane and more rarely beneath the mucous membrane of the rectum. Later the dividing walls give way and the small sacs communicate with each other. The accumulated pus is gelatinous and thick. Generally the ejaculatory ducts become thickened and filled with pus and the seminal vesicles may also suppurate—acute vesiculitis.

When the abscess perforates in the direction of the urethra the resulting cavity fills up more or less slowly, according to the rapidity of the healing process. Sometimes it remains for a long period and becomes the site of a chronic prostatitis connecting with the urethra. At other times the abscess evacuates by way of the rectum or departs in different directions through the enveloping fascia, in which case a *periprostatic abscess* is formed which involves inflammation of the recto-vesical space.

Periprostatic abscess may arise from other causes, wounds or laceration of the rectum, from inflammation of the bladder or seminal vesicles, but most commonly it is propagated from the prostate gland. The extension of inflammation takes place through the venous and lymphatic vessels or is diffused through the cellular tissue (Guyon).

A phlegmon located in this region varies in its size and activity according to the cause and nature of its production. When it is diffused through the cellular tissue the cavity may become limited and remain for a long time. When it is propagated through a lymphangitis or phlebitis it is apt to be more extensive and of more serious import. The abscess is not formed by the combination of several smaller foci, but is generally one separate cavity. A notable feature is that the neighboring organs are not of necessity greatly influenced by the proximity of this inflammation. It is possible to have extensive periprostatic suppuration accompanied by a relatively small amount of functional disturbance. On the other hand, the neighboring organs may be affected and may participate in the inflammatory process. Sometimes a large cavity communicating with the bladder or a fistulous tract in the rectum may remain after evacuation of the abscess. At other times recto-urethral fistula is the result.

**Symptoms and Course.**—In follicular prostatitis complicating acute or chronic urethritis, the symptoms, as stated, vary in intensity with the grade of the inflammation and consist of more or less urgent desire to urinate, and a sense of itching or discomfort in the perineal region. The desire to urinate, however, is not uncontrollable, and the intervals between the calls may be nearly normal unless there coexists inflammation of the neck of the bladder.

In severe cases pain in the prostatic region persists after the bladder has been emptied, and the flow of urine is followed by the passage of several drops of blood. The first flow of urine always contains a certain amount of pus, derived from the prostatic sinus or from the suppurating follicles.

Acute prostatitis, involving at once the whole gland, is sharp in its onset, sometimes preceded by a chill and accompanied by marked pyrexia. Attention is immediately attracted to the prostate by the pain in the perineal region, attended by a dragging or bearing-down sensation. These symptoms often supervene after the unwise or careless use of instruments in the posterior urethra. When the symptoms run high, the possibility of prostatic abscess should be borne in mind. The pain upon urination becomes intense, the few drops of urine remaining in the bladder causing frequent and violent vesical spasm. Between the paroxysms the calls to urinate are not imperative, as is the case in cystitis.

Pain in the rectum is also complained of; defecation intensifies it and provokes vesical and rectal spasm. If the prostate be examined by the

rectum, it is found to be hot, swollen, throbbing, and intensely painful. The enlargement may be symmetrical or confined to one lateral half. Such examination may excite in the patient an irresistible impulse to evacuate both the bowel and the bladder.

Suppuration occurring in the substance of the prostate gland during an attack of acute prostatitis is marked by rigors and chills, increase in the fever, and general malaise. The local symptoms become aggravated, the sensitiveness being so great that every movement of the body intensifies the pain. Defecation is rendered almost unbearable. All of these intense symptoms cease almost instantly after the evacuation of the pus when the malady takes this favorable turn, which is generally the case. Sometimes, however, general sepsis comes on, the chills continue, the temperature mounts, and the indications point toward general systemic infection. This unfavorable course is of grave import and menaces life.

Prostatic abscess generally breaks toward the urethra. Rupture usually occurs spontaneously during straining at stool or the spasmodic efforts attendant upon urination. When the evacuation of pus is complete, recovery is progressive; but when the evacuation is incomplete, all the foci not being freely drained, grave complications are to be feared—septicæmia, infiltration of urine. Recovery may also be retarded by the too rapid closure of the opening, causing the pus to burrow in other directions and leading to the formation of multiple openings (Desnos). Not infrequently the pus burrows toward the rectum, and either discharges directly into the bowel or more commonly diffuses itself into the cellular tissue between the prostate and the rectum—*periprostatic abscess.* When this complication ensues, rectal examination detects the general diffusion of the inflammatory thickening, blotting out the limits of the prostate gland. Laterally the tissues surrounding the prostate effectually limit the course of the pus, but below the resistance is less and there the pus diffuses itself and may open into the urethra, the rectum, the ischio-rectal fossa, or the perineum. The double opening into urethra and rectum is common, yielding urethro-rectal fistula.

**Diagnosis.**—Follicular prostatitis occurring during an attack of gonorrhœa is recognized by an increased urgency and frequency of urination, the occurrence of pus in both flows of the urine, and usually by a coincident cessation of purulent discharge from the meatus. These symptoms, however, also occur in cystitis, and these two conditions are likely to coexist—hence the term urethro-cystitis (page 89).

When inflammation attacks the body of the gland, most of the subjective phenomena are intensified, and marked constitutional symptoms appear, chills, rigors, pyrexia, etc., notably when suppuration occurs. Unless the vesical neck be also implicated, there may be little or no frequency of the urinary call. Rectal examination will detect a hard, painful tumor of unequal proportions, and sometimes a fluctuating point.

Prostatitis involving the body of the gland and cystitis are often confounded. Desnos has modified and improved the table of differential diagnosis prepared by Fournier.

| *Cystitis.* | *Prostatitis.* |
|---|---|
| 1. Characteristic vesical tenesmus. Frequent desire to urinate imperative. | 1. Vesical tenesmus less. Rectal tenesmus more marked. |
| 2. Urination especially painful during the passage of the last drops of urine, accompanied by characteristic spasm. | 2. Urination distressing or painful during the whole act. |
| 3. With the last portion of the urine expression of a purulent or bloody flow, often even of pure blood. | 3. Urine ordinarily normal. |
| 4. Slight perineal pain radiating in the region of the anus, much less violent than in prostatitis. | 4. Perineal pain marked, very intense, increased by movements, defecation. |
| 5. Prostate normal. | 5. Prostatic tumor, very sensitive and hard. |
| 6. No complete retention of urine. | 6. Difficulty in passing the urine, sometimes retention. |
| 7. Few or no general symptoms. | 7. General symptoms very marked, fever, etc. |

Cowperitis is distinguished by recognizing the seat of the inflammation to be the anatomical region of Cowper's gland in front of the deep urethra and by excluding prostatitis by rectal examination. A seminal vesiculitis may be present with the same symptomatology as that of prostatitis, but is easily recognized at the onset by rectal examination.

When periprostatitis occurs, the swelling diffuses itself in the surrounding tissues, including the seminal vesicles, and the recognition of the original trouble may then be much more difficult.

**Treatment.**—The treatment of acute follicular prostatitis is that of posterior urethritis, which see.

The aim of treatment in acute parenchymatous prostatitis should be to prevent the occurrence of suppuration, and calls for antiphlogistic measures. Hot sitz-baths or hot applications to the perineum are generally a source of comfort to the patient, in which case they should be used freely. In very acute cases the application of cups, leeches, or a blister to the perineum is desirable, for the purpose of relieving the inflamed organ by lowering its tension. Anodynes may be given to allay pain, which is sometimes exceedingly acute and often remains in spite of the use of such remedies, pushed almost to the point of narcotism. Morphine hypodermically and suppositories of opium, belladonna, and cocaine may be employed. Confinement to bed is essential. No other medicinal treatment has any particular value. The diet should be plain, the bowels be assisted. The urine, if highly charged and acid, should be diluted by alkaline diuretics, and if retention occur, the catheter must be used very

regularly and with the utmost gentleness. It is generally the case in acute parenchymatous prostatitis that relief from the acute pain is not had until the tension in the gland is relieved by the subsidence of the inflammation; or, when suppuration occurs, until the evacuation of the pus. When it becomes evident that pus has formed, it must be let out at once. As already stated, the abscess may point toward the urethra, the rectum, or the perineum. When it points toward the urethra it often leads to urinary retention, and the pus escapes either spontaneously or during the use of the catheter. Superficial fluctuation, detected by rectal touch, calls for puncture through the wall of the gut. If the pus be deeply seated, a more surgical and better drainage is attained by the pre-rectal incision, dissection being carefully made upward until pus is reached. The advantage of this method is that urinary fistula is quite certainly averted. Nature even is sometimes intelligent enough to elect this route, in which instance a superficial incision is all that is required. The cavity is then washed out with hot normal salt solution, and if the hemorrhage be great, it is packed with absorbent gauze. The gauze may be removed in twenty-four or forty-eight hours, and replaced or not, as seems best. The after-treatment consists in keeping the external opening pervious until the cavity contracts down, which should be encouraged, if necessary, by stimulation. This, however, is generally not required, as, when proper drainage is afforded, the cavity rapidly contracts.

## Chronic Prostatitis.

This malady is usually a direct propagation by continuity of chronic posterior urethritis, and it may yield symptoms of so little note as sometimes to be entirely overlooked and disregarded, consisting only of a little sticky discharge which usually glues together the meatus in the morning. At other times the discharge is more copious and annoying.

Prostatorrhœa is a disorder which resembles chronic prostatitis, in that it is a mild and chronic condition accompanied by few or no symptoms other than a small amount of urethral discharge appearing at varying intervals. The discharge in prostatorrhœa is not muco-purulent, but simply an excess of the normal prostatic secretion; and the malady has not necessarily any venereal origin. These two troubles are often confounded and the terms used interchangeably.

Sturgis[1] has directed attention to this confusion that exists in the printed descriptions of the two maladies, and has clearly accentuated the points of difference. Chronic prostatitis then is a latent inflammation, a remnant of pre-existing acute trouble; whereas prostatorrhœa, a more rare disorder, consists in a leakage of the prostatic secretion due to the

[1] Journal of Cutaneous and Genito-Urinary Diseases, June, 1898.

relaxation of the mouths of the prostatic ducts, and may be caused by masturbation, excessive sexual indulgence, etc. Both of these maladies are liable to be attended by various reflex nervous phenomena, psychical disturbances, and sexual debility and neurasthenia. The significance of the discharge is overestimated by the patient, who often, particularly in prostatorrhœa, imagines that the flow is a seminal loss, and he therefore aggravates all his symptoms by mental introspection. Instead of this mild type of prostatitis which approaches so nearly to prostatorrhœa, there is another type in which the suppuration in the prostatic sinus is very profuse, the dilated sinus containing not drops of pus but drachms, as may be demonstrated by washing out the pouch. One or more of the follicles of the prostate may be distended with pus, which exudes from their dilated mouths into the prostatic sinus. There may exist an interstitial prostatic pus cavity, the remnant of an old prostatic abscess, which has not contracted down. Examination per rectum in chronic parenchymatous prostatitis will detect prostatic enlargement, generally unsymmetrical, sometimes nodular, and pressure upon the gland will express a quantity of its fluid contents, which will consist of pus cells and prostatic secretion, differing from that which is obtained by pressure in a case of prostatorrhœa, which consists of prostatic secretion pure and simple, and is devoid of the products of inflammation.

There is an interstitial form of chronic prostatitis involving cellular infiltration of the gland and the obliteration of its glandular elements by the formation of new fibrotic tissue. Such a condition may eventually lead to atrophy, contraction, and diminution in the size of the organ. There is no distinct line of demarcation between the follicular, the parenchymatous, and the interstitial forms of prostatitis, any one of which may occur alone. They are liable to coexist, and the classification is more or less arbitrary.

**Symptoms.**—Chronic prostatitis often exists without any symptoms of sufficient moment to attract the attention of the patient, and this may be true of active as well as of light cases. A chronic follicular prostatitis involving the ejaculatory ducts and the prostatic sinus may be attended by pain during the sexual act and a certain amount of purulent discharge. A much higher grade of trouble, involving even interstitial changes and parenchymatous inflammation, may exist without a corresponding increase in the intensity of the symptoms. Heat and bearing down in the perineum or rectum are sometimes complained of. Neuralgic pains radiating down the legs and toward the fundus of the bladder sometimes are the chief annoyance. Reflex nervous symptoms and mental depression are often present, but belong equally to the clinical history of all chronic disturbances of the genital apparatus, and therefore are not pathognomonic. Functional impotence occurs or premature ejaculation due to hyperæsthesia of the ejaculatory ducts. Sterility is possible from

azoöspermia, caused by obstruction of the seminal ducts or by inflammatory cohesion.

Prostatorrhœa, or excessive flow of the prostatic secretion, may be present, due to dilatation of the excretory ducts of the prostate, in which case, however, inflammatory products are found mingled with the prostatic discharge. This discharge, as in prostatorrhœa simplex, may be increased by movements of the body and by defecation. True spermatorrhœa, as shown by the presence of spermatozoa in the discharge, the

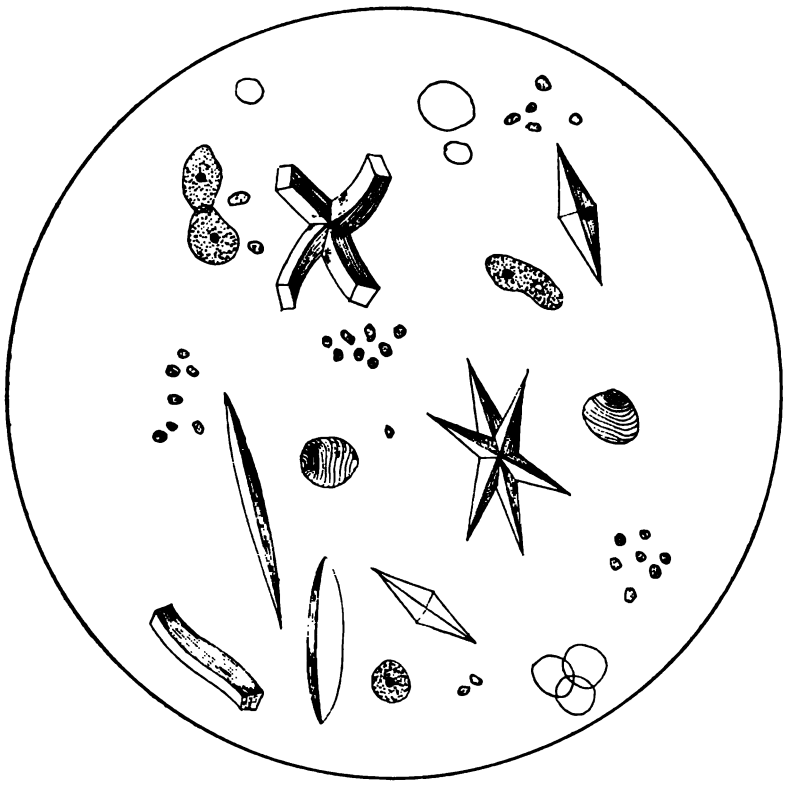

FIG. 46.

result of inflammatory catarrhal dilatation of the seminal ducts, often complicates chronic prostatitis. The prostate is always sensitive when examined per rectum, a feature more or less marked in different individuals. The nature of the discharge obtained by pressure upon the prostate varies, being sometimes a free gush of normal prostatic secretion with the admixture of a small amount of purulent matter, at others a large quantity of pus combined with only a few of the elements of the normal prostatic fluid, demonstrating that while these two conditions of prostatorrhœa and prostatitis may be differentiated theoretically, yet clinically they are less

easily separated and are liable to coexist. Strictly speaking, prostatorrhœa is a symptom, not a disease—a symptom which generally enters the clinical history of prostatitis more or less.

**Diagnosis.**—A strict diagnosis of chronic prostatitis depends upon the character of the prostatic secretion squeezed out by digital pressure per rectum. The subjective symptoms are not to be relied upon. Microscopical examination of the discharge is important to differentiate prostatitis, prostatorrhœa simplex, spermatorrhœa, urethritis, and urethrorrhœa.

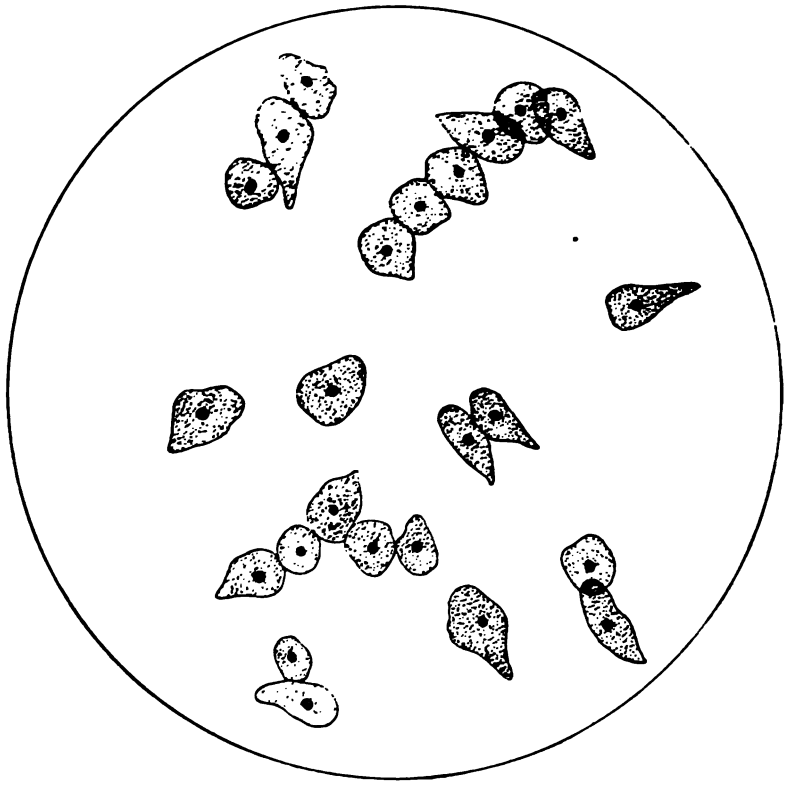

FIG. 47.

In making such investigation it is important to examine first the discharge, if any, which may be lying in the anterior urethra; next, that which is found in the urine after the anterior urethra has been washed or after the first flow of urine; and finally that which is found in the last urine after the prostate shall have been manipulated through the rectum. The physical character of the urethral discharge is known to vary in the different conditions named. A purulent discharge signifies an inflammation in the anterior or posterior portion of the canal. Prostatorrhœa simplex, as already stated, yields an excess of prostatic secretion, which escapes from

the urethra spontaneously and during muscular effort. Such a discharge is neutral or mildly acid in reaction. It has the seminal odor. It is white in appearance and is smooth and slippery. A microscopical examination reveals the accompanying picture, which contains amyloid, hyaline, and lecithin bodies, epithelium and Boettcher's crystals (Fig. 46), the latter being seen only in secretions from the prostate and are produced by the addition of a one-per-cent solution of phosphate of ammonia. This secretion, as will be seen, possesses none of the elements of inflam-

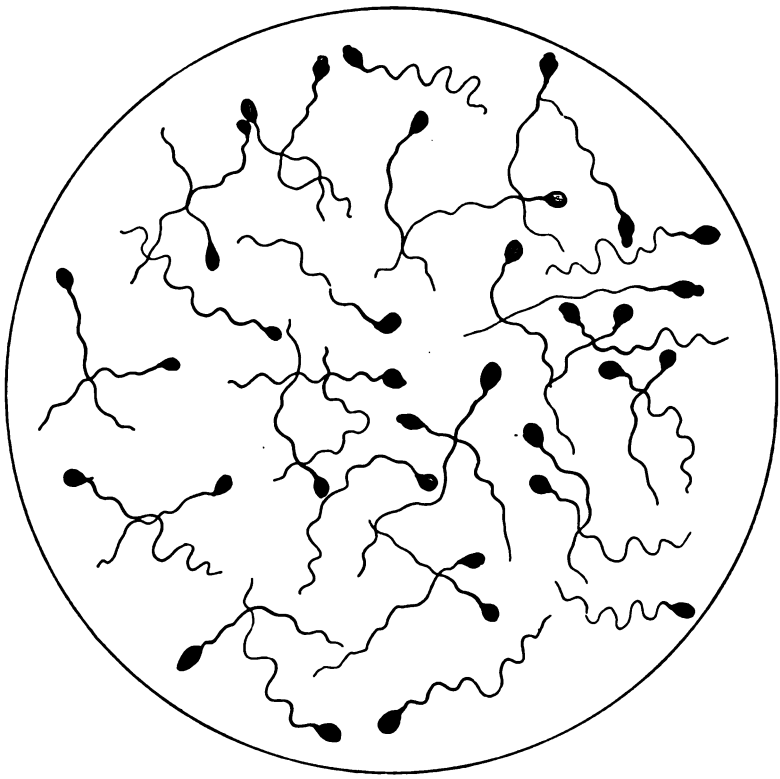

FIG. 48.

mation. Its presence here would indicate the coexistence of prostatitis, from which, theoretically at least, prostatorrhœa simplex must be clearly distinguished.

Urethrorrhœa ex libidine consists of a hypersecretion from the glands of the urethra. The discharge is thin and watery, sticky and tenacious, and the patient may notice that upon placing his finger over the meatus the discharge may be drawn out for some little distance, resembling in this particular a bit of gum or sap. It has no seminal odor and it consists microscopically of a collection of flat epithelial cells and some free mucus,

but none of the elements which are found in the secretion of a prostatorrhœa (Fig. 46). This discharge is also, in an uncomplicated case, entirely free from the elements of inflammation.

Spermatorrhœa produces a discharge which is gelatinous in character, mildly alkaline in reaction, and possesses the seminal odor. Microscopically we find the unmistakable evidence of the character of this discharge in the presence of spermatozoa (Fig. 48). We have also the elements of the prostatic secretion, and in inflammatory conditions we find the elements

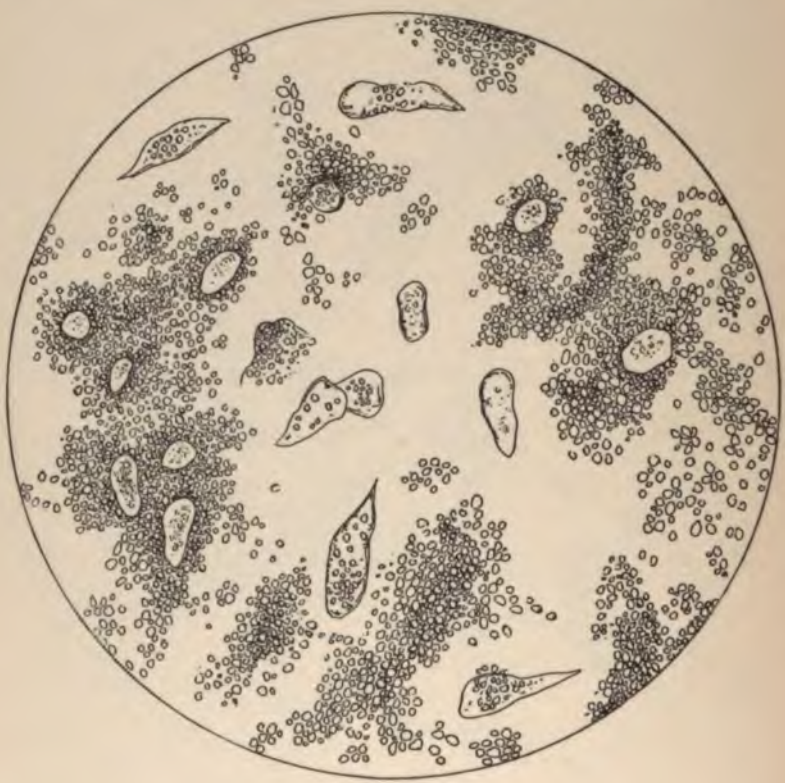

FIG. 49.

of inflammation; but the presence of spermatozoa in a secretion from the urethra at any time except following an emission is the one sign necessary to determine the existence of spermatorrhœa, which condition may exist as a result of an atonic state with dilatation of the seminal ducts, or as a symptom of prostatitis or vesiculitis. The discharge of prostatitis may be scanty or abundant. It oozes spontaneously from the urethra, but in order to establish its origin it is better first to wash out the urethra with warm saline or boric-acid solution and then obtain the discharge for examination from the first flow of urine, or to examine that which is expressed

from the gland by pressure through the rectum. The gross appearance of this discharge is more or less purulent, differing from that of prostatorrhœa and that of urethrorrhœa which do not possess this characteristic. It has nothing whatever in its gross appearance to distinguish it from the inflammatory discharge of other portions of the canal, and it is therefore important that it be obtained for examination after the anterior urethra shall have been cleansed. It is a difficult matter to determine by microscopical examination the locality from which the epithelium in a given specimen is derived. The exudation from a chronic prostatitis will present a microscopical picture, as shown in Fig. 49, containing granular phosphates, leucocytes and epithelia, and in addition any of the elements of the normal prostatic secretion as seen in prostatorrhœa (Fig. 46) may be found.

The gross appearance of the urine in chronic prostatitis may show only the presence of urethral filaments or of a small or large quantity of free pus. In locating the origin of urethral filaments or of the free pus, it is proper to take the precaution of first cleansing the anterior canal and then obtaining the urine in two separate flows. The first flow will then wash out the contents of the prostatic canal, which may be a quantity of free pus or one or two shreds or lumps, and the latter will present different appearances, as they happen to be more or less granular or gelatinous. There is sometimes a solitary shred of a definite tadpole shape as though it had been expelled from the mouth of one of the ejaculatory ducts. Microscopically they are composed of pus cells and mucus, and also may contain any of the other elements of the prostatic or seminal secretion. The examination per rectum will distinguish any alteration in the size and sensibility of the prostate, and also any implication of the seminal vesicles, which, if distended by catarrhal secretion, may be felt beyond the prostate on either side of the base of the bladder, varying in size from a peanut to that of a small egg. Cystitis of the neck of the bladder is readily identified by the frequency and pain of urination, notably at and after the expulsion of the last portion of urine, and often by the existence in the last flow of a greater amount of pus than in the beginning. Cystitis often coexists with chronic prostatitis.

**Treatment.**—In the adoption of local treatment for chronic prostatitis, by way of the urethra, certain measures have been recommended which, in our opinion, are a source of irritation rather than a means of relief. Such are the unnecessary passage of bougies and other instruments intended to overdilate the canal, and the use of medicated bougies. Some cases of chronic prostatitis require about the same treatment and management as that recommended for chronic urethritis (see p. 43), mild irrigations of permanganate of potassium, about 1 : 4,000 to 6,000, or of the nitrate of silver or corrosive sublimate, the former 1 : 4,000 to 6,000 (and when well tolerated even stronger), the latter 1 : 12,000 to 16,000. The

method of irrigating the prostatic urethra has been already described (page 28). Instillations are also often found useful in chronic prostatitis. The nitrate of silver heads the list. It should be tested gently, for it may disagree. It is used in a solution of from gr. ss. to gr. x. to the ounce, and sometimes stronger, and probably more often than the other preparations because it is quite generally effective, often brilliantly so. A few drops only of the strong solutions are needed, the quantity being reduced as the strength of the solution is increased. Thallin and

FIG. 50.—Tuttle's Rectal Tube.

the other drugs already referred to (see p. 47) will be found to suit some of these cases. The use of the endoscope in the posterior urethra has already been discouraged. The authors of this treatise can do better with other means. It is, however, advocated by some, who claim better results by this means than by other methods. The Grünfeld endoscope is advocated for the purpose of making direct application of the caustic agent, nitrate of silver or chloride of zinc, to the veru montanum. It is not clear why such active cauterization of the veru montanum should be better than gentler astringent applications to the entire prostatic sinus, more particularly if the parenchyma of the prostate be involved as well as the surface of the mucous membrane.

To reach deep-seated chronic inflammatory alterations of the prostate,

FIG. 51.—Chetwood Tube for Rectal Irrigation.

such measures as will act directly upon the circulation of the organ may be instituted. One of these is massage of the prostate, accomplished by the finger introduced into the rectum. Gentle lateral pressure may thus be made upon the prostatic tissues, while at the same time the secretion in the swollen and turgid follicles is forced out. This, both to the

patient and the surgeon disagreeable manipulation is sometimes quite useful in very chronic cases. Many trained nurses and massage operators understand and practise it. But better than this last procedure we consider the application of moist heat to the region of the prostate by rectal irrigation. It is a fact that the rectum will tolerate a very high degree of temperature when employed in this manner, and sometimes by this means strikingly beneficial results are obtained in old chronic cases of prostatitis which have long resisted the continued efforts directed tow-

FIG. 52.

ard the urethral surface of the gland. The figure on this page illustrates the method of employing the hot-water rectal douche by means of a tube especially devised for this purpose—a modification of Tuttle's or Kemp's rectal tube (Fig. 51). The hot water from a fountain syringe passes into one arm of the tube and enters the rectum through two very small apertures on its circumference near the distal end. A large opening at the extremity connects with an interior tube as large as the calibre of the outer one will allow. Through this the immediate return of the hot water from the rectum takes place, and thus a continuous circulation of

moist heat around the prostate is kept up so long as the operation is continued, which is generally from ten to fifteen minutes. The end of the tube needs a little manipulation to insure continuous outflow of the injected fluid. Instead of the sitting posture which is assumed in the accompanying figure, the knee-chest position may be substituted and often with better results. This operation should be conducted every night for an extended period, according to the effect produced. Improvement is often noted almost immediately, and sometimes it is surprising to discover that in the absence of any other local treatment the character of the urine, which had been thick and turbid with pus, clears up promptly. Most cases, however, are less brilliant, and it is sometimes necessary to urge the continued use of this rectal tube for a long period before permanent results are obtained; but when improvement has taken place under its use, permanent relief may be hoped for if the douche be used persistently. The general condition of the patient should receive attention, and any disturbances of nutrition properly treated. Iron, arsenic, and hypophosphites have their indications as tonics, and cod-liver oil seems to possess a special value, as in most other debilitated conditions. Prostatitis may be tuberculous in character, or occur in individuals who have the tuberculous diathesis. Indeed, posterior urethritis is not infrequently the exciting cause of local tuberculous deposit. Such cases naturally do not get well under instillations, irrigations, or the rectal douche. Thallin sometimes comforts them, and the hot rectal douche does the same, but radical treatment means a transportation to a favorable climate, plus the usual internal constitutional remedies directed against tubercle wherever situated.

### Inflammation of the Seminal Vesicles.

Inflammation of these organs, or spermatocystitis, occurs as a gonorrhœal complication following severe or prolonged suppuration in the posterior portion of the urethra. It frequently coexists with inflammation of the prostate and often with acute epididymitis, but in such cases it is a side issue and may be disregarded until the epididymitis shall have disappeared. Any inflammatory condition existing in the prostatic sinus may extend by continuity into the vesicular reservoirs, but gonorrhœal posterior urethritis is more liable to take this course than other inflammations. It is claimed by some that this propagation of inflammation from the prostate is by way of the blood-vessels or lymph channels, but the claim has not been substantiated. That seminal vesiculitis may exist as a separate and distinct affection there is no possible doubt, but it is most often a complication of gonorrhœa which has invaded the posterior urethra.

**The symptoms** of acute seminal vesiculitis resemble those of acute posterior urethritis and prostatitis; sometimes there is more fever.

They are a sense of pressure, pain, and rectal tenesmus, painful erections, and sometimes spermatozoa in the urethral discharge and purulent or bloody seminal emissions. This latter is by no means a constant symptom. Examination per rectum will detect an enlarged and tender, sometimes fluctuating mass in the region of the vesicles, extending from the limit of the prostate upward along the base of the bladder on one or both sides. When abscess forms, as is sometimes the case, it may discharge itself forward into the urethra or backward into the rectum. Such abscesses have been known to point into the abdominal cavity, causing fatal peritonitis. The symptoms not being entirely distinctive of this disorder, the diagnosis must depend upon rectal examination. When vesiculitis coexists with prostatitis, the swelling and infiltration will be found to destroy the line of separation between these organs; but when it is limited to one or both vesicles, a careful exploration may distinguish the outline of the prostate.

**Chronic Seminal Vesiculitis.**—This is usually a natural sequence of the acute trouble, or may come on insidiously as a complication of the chronic gonorrhœal urethritis which has invaded the posterior urethra and thence extended itself to the prostate and vesicles. It is often due to excessive sexual indulgence, even without an antecedent gonorrhœa, or to the abuse of venery and alcohol, or to the employment of harsh local treatment in the posterior urethra during a congested or inflammatory state. It is probable that tuberculous and rheumatic subjects are more prone to chronic vesiculitis, as they are generally more likely to be the victims of prolonged and intractable attacks of posterior urethritis.

The **symptoms** of chronic vesiculitis resemble those of chronic prostatitis, and vary greatly in severity. Sometimes there is no symptom other than a chronic urethral discharge, which has resisted all the various local and general therapeutic attacks. In addition, there may be noted frequent nocturnal pollutions, bloody or purulent in character. Alterations in the sexual capacity and appetite may also be a feature. Neurasthenic symptoms, as in prostatitis, are commonly present, and indefinite and intermittent pains radiating through the perineum, down the thigh, and into the hypogastric and lumbar region may also be complained of.

**Treatment.**—The treatment of seminal vesiculitis resembles that adopted for acute and chronic prostatitis. During acute inflammation rest and freedom from all sexual excitement are imperative, and antiphlogistic measures suitable in the endeavor to avert suppuration. A bland diet, alkaline diluents, and mild laxatives, together with hot sitz-baths or hot applications to the perineum, are all in order. If an abscess forms in spite of these measures, its contents should be evacuated by a rectal incision as soon as fluctuation can be distinctly made out. Massage and rectal douches are not only improper in the acute stage, but are liable to cause irritation and do harm. When the abscess has discharged itself

spontaneously or by incision and the acute symptoms have subsided, treatment becomes the same as that employed in the chronic condition.

In chronic inflammation of the seminal vesicles infiltration and vascular engorgement of these pouches exist with sometimes narrowing or occlusion of the ejaculatory ducts, but usually catarrhal dilatation. The aim of treatment is to facilitate drainage of the distended catarrhal pouches and by improving the circulation to overcome the catarrh. For this purpose a systematic massage of the vesicles themselves and of the adjacent prostatic region has been strongly advocated, notably by Dr. Eugene Fuller; a process termed "stripping the seminal vesicles" being relied upon to effect a cure. That many cases are benefited by this, what may be called drainage method, there is no doubt; but if equally good results can be obtained by other means, the irritation, which is sometimes caused by pressure upon the vesicles, may be avoided, and the surgeon will necessarily give his preference to another equally effective procedure, especially as the regular employment of the alternative stripping measure is not agreeable, and may be as well carried out by a trained nurse. For this purpose we have used in many cases the rectal irrigating-tube already referred to when considering the treatment of prostatitis (page 85, Fig. 52). By this application of moist heat a beneficial result may be looked for in this region, whether the inflammation involve the prostate alone or coexist with a catarrhal distention of the seminal vesicles. This hot-douche irrigation brings about the same results as the application of massage. It assists the overdistended vesicle in voiding its contents, and by its resolvent action upon the circulation encourages resolution of long-standing inflammation. An additional advantage is that it can be employed by the patient himself, and no matter where he may be, it is generally possible for him to obtain the benefit of continuous treatment when circumstances might not permit him to make frequent calls upon his physician. In long-standing and chronic cases, like massage it should be persisted in patiently over a long period. Some cases yield to it which have not been favorably influenced by massage. Some are entirely cured by it, others greatly improved. Those that fail to improve are quite likely to be tuberculous or to have prostatic hypertrophy or contractured vesical neck, conditions equally unsuitable for massage. The last-named condition—contracture of the neck of the bladder—is not an infrequent result of prolonged suppurative inflammation in the posterior urethra. If its symptoms are urgent, they call for perineal cystotomy for the purpose of incising laterally the fibrotic ring, a means which alone insures relief of symptoms.

# CHAPTER V.

## ACUTE AND CHRONIC CYSTITIS.—EPIDIDYMITIS.

Inflammation of the neck of the bladder may complicate urethritis under a variety of circumstances. It very rarely occurs spontaneously during gonorrhœa. Generally some immediate exciting cause produces it. Among the most common of these are the use of strong injections, especially if thrown too deeply into the canal; strong and continued sexual excitement, or attempts at intercourse during a gonorrhœa; excess in physical exertion of any sort; abuse of liquor; excessive use of cubebs, turpentine, or cantharides; the use of instruments in the urethra during an acute attack, or at any stage if there be any lack of perfect gentleness in manipulation during such instrumentation.

All of these, and certain other analogous causes, are sufficient to excite gonorrhœal cystitis in a patient having a urethral discharge, although the attack itself may have become very mild, and much the more so when the symptoms are intense. The same exciting causes are also sometimes productive of cystitis when the urethritis is due to the presence of stricture, and not very infrequently an attack of mild cystitis comes on in a patient with a diseased urethra, the exact immediate cause of which cannot be determined.

Gonorrhœal cystitis is often not encountered until the urethral discharge has been active for several weeks, but may come on earlier.

The lesions of acute gonorrhœal cystitis are generally confined to the neck of the bladder, and with them are likely to coexist lesions of the posterior urethra. The term urethrocystitis has been applied to this condition, signifying inflammation commencing in the posterior urethra and extending into the bladder, where it is limited to the region of the trigone and internal sphincter.

Acute cystitis proper, involving the entire surface of the vesical mucous membrane, is a rather rare complication of gonorrhœa, but does occur.

In urethrocystitis the mucous membrane in the vicinity of the neck of the bladder becomes swollen, red, and velvety, in continuation of a similar condition in the prostatic urethra. When this process has existed for some time and become subacute or chronic, the neck of the bladder is covered with granulations; while if the entire organ is involved, the

general mucous membrane assumes a slate color and a reticulated appearance, and may be the seat of ulcerations or small abscesses. If this morbid change extends still farther, a "parenchymatous cystitis" is the result, the deep portions of the mucous membrane are implicated, and the muscular coat becomes infiltrated.

Finally the pelvis of the kidney on one or both sides may become invaded from propagation of the inflammation upward through the ureters. The gonococcus is found in the pus in some cases. In many

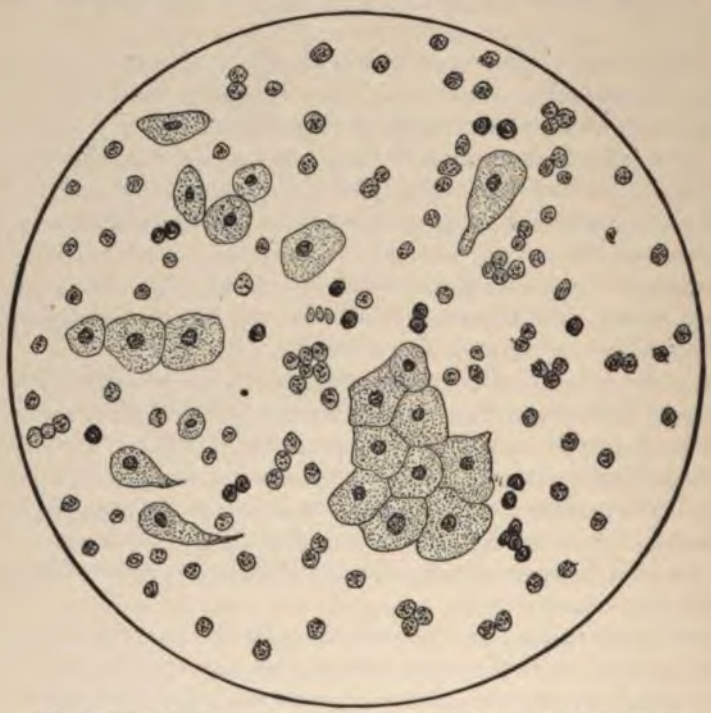

FIG. 53.—Acid Cystitis. Pus corpuscles, red blood cells, and bladder epithelium.

its presence cannot be demonstrated, while other micro-organisms are found in large numbers.

The urine in gonorrhœal cystitis varies according to the character and intensity of the inflammation. In the acute stage it is generally acid, loaded with pus, and contains epithelium from the bladder and urethra, sometimes blood (Fig. 53). When decomposition takes place within the bladder, the characteristic crystals of ammonio-magnesium or triple phosphates, amorphous phosphates, and sometimes urate of ammonia crystals with numerous bacteria are seen on microscopical examination (Fig. 54). Such urine is alkaline in reaction and has a characteristic foul ammoniacal odor.

**Symptoms.**—The symptoms of gonorrhœal cystitis vary with the in-

tensity of the inflammation. They are frequent desire to urinate, accompanied by a varying amount of pain and urgency, and the passage of turbid, purulent urine.

In all forms of cystitis there exists a certain amount of urinary urgency, which while mild and controllable in light cases, becomes intense and imperative in the acute condition, accompanied by sharp pain and hæmaturia. The blood may appear as a coloration of the last drops of urine, or be of sufficient quantity to redden the entire flow. In acute urethro-cystitis

FIG. 54.—Alkaline Cystitis. Pus corpuscles, bladder epithelium, crystals of triple phosphates, and bacteria.

the symptoms are mainly those of acute posterior urethritis, varying in intensity from a slightly increased desire to urinate, with bearing-down pain toward and after the end of the urinary act, to a much greater urgency in the calls, which become as frequent as every quarter to half hour, attended perhaps by hæmaturia due to the high grade of congestion. Each spasmodic effort to empty the bladder rubs together the inflamed surfaces of the mucous membrane and intensifies the condition. When the urine is passed into two glasses both flows are turbid, the second being as cloudy as the first, and sometimes more so. If the urine is passed into three separate glasses the third flow will also be cloudy from the presence of pus, sometimes more and sometimes less so than

that in the first glass; but it will always be turbid, which is not the case when the posterior urethra alone is involved. Involuntary urination or false incontinence occurs in acute cases when the calls to urinate are imperative, the patient being unable to restrain the bladder contraction. Complete retention sometimes occurs, but infrequently and as a result of urethral spasm, whereas incomplete retention due to swelling of the tissues around the neck of the bladder is less uncommon.

In chronic urethro-cystitis the symptoms are the same but milder, and as time goes on they gradually diminish unless the vesical neck becomes contractured, in which case they persist almost indefinitely. Chronic cases are always subject to acute relapse. As a result of prolonged chronic inflammation and infiltration, acting as an obstruction to the evacuation of its contents, the bladder atonies and the presence of a certain amount of residual urine may become constant. This urine may be of acid reaction, containing all the elements of inflammation; or if decomposition has set in, it may show all the characteristic elements of ammoniacal urine (Fig. 54).

As urethro-cystitis comes on, the patient at first passes water a little more often than usual by day (sleeping perhaps through the whole night), and the urethral discharge lessens, which is taken by the patient to be a favorable sign. Soon, however, it is found that the calls to urinate become more urgent. Then follow pain on urination, and a sharp, grinding, bearing-down pain following each act of urination, due to the fact that the empty bladder continues to contract and squeezes its own tender neck.

From this time on there is a constant sense of weight, a dull pain over the pubic symphysis, more or less heat and discomfort in the perineum, a constant sensation of fulness of the bladder, calling for repeated and unavailing straining to pass water, the best efforts culminating in a spurt of only a few drops of turbid urine full of pus and often tinged with blood. When this state has been reached the patient may become feverish, with dry tongue, parched lips, and constipated bowels.

Gonorrhœal cystitis generally gets perfectly well in a period varying from a few days in mild cases up to a couple of weeks, or even several months, in bad cases. Sometimes permanent irritability is left behind, and persists as a chronic cystitis, with more or less fibrotic thickening—contracture—of the vesical sphincter and a relative amount of occlusion of the urethral orifice of the bladder.

**Treatment.**—In mild cases rest upon the back may be all that is required in the way of treatment. The application of heat, as in a hot-water bottle, affords considerable comfort when placed over the bladder or against the perineum.

The alkaline diluent, copaiba or sandal-wood oil, if being administered for urethritis, should be continued, and bland drinks, like flaxseed tea,

elm-bark decoction, infusions of triticum repens, buchu, afford the patient some comfort, but do not do much good, excepting in so far as they are mildly diuretic.

Diluent mineral waters drunk freely are unquestionably of value in these cases, and an exclusive milk diet has a peculiar merit. The latter must be accompanied by enough of some mild vegetable laxative to overcome its constipating tendency. If it purges, as is sometimes the case, skimmed milk may be substituted for whole milk. A gallon a day is full diet for a healthy man. If so much can be managed by the stomach, nothing else whatever need be given either to eat or to drink.

All those articles of food and drink which were condemned in the dietetic section on the treatment of gonorrhœa must be equally avoided here.

Hot hip-baths are of service. The heat of the bath should range in the region of 110° F., the pelvis should be covered by the water-line, and the bath be not longer than three or four minutes in duration. Such baths may be repeatedly taken every few hours during the day when they afford relief.

As for medicines, anodynes hold the first rank. The frequency of urination must be stopped. The following combination will give relief in mild cases:

| | | |
|---|---|---|
| ℞ Ol. santal. or gaultheriæ, | . . . . . | ℥ ss. |
| Liq. potassæ, | . . . . . | ʒ ij.–vi. |
| Tr. hyoscyami, | . . . . . | ʒ vi. |
| Syr. acaciæ, | . . . . . q.s. ad | ℥ iij. |

M. S Teaspoonful in water every four hours.

Hyoscyamus may be used alone, as tincture, in half-drachm doses several times a day, with the happiest effect in the cases in which it agrees.

When mild measures of this sort fail to control the frequency of urination, a positive anodyne must be employed. Half-grain or whole-grain suppositories of the watery extract of opium, with one-third to one-half of a grain of the extract of belladonna, may be used and repeated often enough to keep the intervals of urination two hours long. The belladonna sometimes disagrees. A tablet triturate of codeine (one-quarter grain every three or four hours) may be used for the same purpose, to keep the intervals of urination two hours long by daylight, or an analogous liquid preparation:

| | | |
|---|---|---|
| ℞ Elix. opii (McMunn), | . . . . . | ʒ vi.–xij. |
| Liq. cascara aromat., | . . . . . | ℥ ss.–iss. |
| Aq. cinnamomi, | . . . . . q.s. ad | ℥ iij. |

M. S. Teaspoonful three or four times a day.

By persistence in these means, the pain, the tenesmus, and the frequency of urination will gradually subside, and the discharge begin to

reappear at the meatus. For this return, some mixture of copaiba should be used internally, since the effect of this drug upon the bladder is often also quite beneficial. The following capsule is a good one:

℞ Copaibæ, . . . . . ♏ vij.
Oleoresin. matico, . . . . . ♏ iij.
S. Three to six capsules daily.

At this stage the question of resuming local measures against the urethral discharge may be properly considered.

**Local Treatment.**—During the most acute stage of gonorrhœal cystitis it is better to depend upon antiphlogistic measures and the internal treatment, which has already been detailed. Local measures are generally to be interdicted during this period, as they are liable to increase the irritation rather than to allay it. When the acute stage has subsided, however, and in subacute and chronic cases generally, local measures are decidedly indicated. Some cases which seem to be irritated by local applications are benefited by irrigations with plain hot normal salt solution or boracic acid three per cent. Other cases are decidedly helped by irrigations of permanganate of potassium in the same manner as employed in acute anterior and posterior urethritis (p. 29). The value of this latter remedy in a given case is generally quickly determined. If the benefit be not prompt, the irrigations should be discontinued. Solutions of nitrate of silver sometimes prove more efficacious than any other remedial agent in the treatment of gonorrhœal cystitis. The strength of such solutions varies from 1:16,000 to 1:2,000, according to the tolerance of the bladder. They should be used in the same manner as the permanganate of potassium—that is, they should be injected into the bladder through the posterior urethra and thus their beneficial influence exerted upon this latter region. If after the cessation of the acute stage of cystitis the urethritis has recurred and is accompanied by a more or less copious discharge of pus, it is well also to irrigate the anterior urethra before introducing the catheter for posterior irrigation, but this is necessary only when anterior urethritis is present. If permanganate of potassium is being employed for bladder irrigation, the anterior urethra can be irrigated in the regular way; but if the nitrate of silver is being employed in the bladder, this agent should not be used for anterior irrigation, as its decidedly astringent effect upon the urethra will interfere with the introduction of the catheter and cause considerable annoyance. If irrigation of the anterior urethra be deemed necessary, the permanganate of potassium should be used for this purpose or the urethra may be syringed out with plain boric or saline solution. When after a certain period the symptoms of cystitis have subsided, and the examination of the urine in test glasses shows that the trouble has concentrated itself in the posterior urethra, the bladder irrigations may be discontinued and the treatment

by instillation adopted as described under the treatment of chronic urethritis (p. 45).

In cases of chronic cystitis the antecedent cause should be determined, as the persistence of such cause may largely influence the continuance of the bladder inflammation. In this we refer to the existence of stricture, chronic prostatitis, and chronic seminal vesiculitis. When found these conditions should be properly treated as has been detailed under their respective headings. The treatment of chronic cystitis proper requires local applications to the bladder and the use of a mild non-stimulating diet. Medication should vary according to existing conditions in a given case, as revealed by urinary examination and personal idiosyncrasy. A careful examination of the urine should be made in all cases. As already stated, such examination will show purulent urine containing various micro-organisms, sometimes acid in reaction and sometimes alkaline with ammoniacal decomposition. Alkalies and diluent mineral waters are indicated when the urine is strongly acid and of high specific gravity. Alkalies, however, should be used with discrimination and not to excess, as hyperalkalinity of the urine is to be guarded against. When the urine is alkaline, urotropin, salol, methylene blue are often of decided benefit as urinary antiferments, and will assist in restoring the urine in the bladder to its normal state. From gr. xxx. to lx. of salol should be given daily in divided doses. One of the formulæ put up in capsule form containing salol in combination is also sometimes useful.

FORMULA 1.

| | |
|---|---|
| ℞ Salol., | gr. iiiss. |
| Oleoresin. cubeb., | ♏ v. |
| Copaib. Para, | ♏ x. |
| Pepsin., | gr. i. |

Capsule No. 1.

FORMULA 2.

| | |
|---|---|
| ℞ Salol., | gr. iv. |
| Oleoresin. cubeb., | ♏ v. |
| Ol. santal., | ♏ v. |
| Pepsin., | gr. i. |
| Ol. oliv., | ♏ v. |

Capsule No. 1.

From six to eight of one or the other of the above capsules may be given in each twenty-four hours. Occasionally salol disagrees with the stomach, especially in large doses. It may in such cases color the urine a smoky green when it should be stopped.

*Bacteruria* is a constant symptom of chronic cystitis, and sometimes very difficult to overcome. As already stated, salol is sometimes very useful in re-establishing the normal aseptic condition of the urine. When this drug fails, one of the other internal antiseptics may be resorted

to. Methylene blue in capsule form, gr. ij. three times a day, is given for this indication, and often with good effect. It rapidly colors the urine bluish-green, and is objectionable on this account as it is liable to stain the patient's linen and sometimes deranges the stomach and bowels. Urotropin, the ammonia salt of formaldehyde, has been recommended as a uric-acid solvent and as an internal antiseptic. In some cases its effect is markedly beneficial in conditions of pyuria or bacteruria, and in others it seems to be a source of irritation to the stomach and mucous membrane of the urinary tract. It may be given in five- to ten-grain doses from three to six times daily, in tablets or in powder form. Cystogen is an analogous preparation which may be given in the same quantity.

The local treatment of chronic cystitis calls for bladder irrigations of a rather more stimulating character than in the acute form. The permanganate of potassium is sometimes useful. Nitrate of silver, when well tolerated, should be employed in increasing strength from 1:4,000 to 1:2,000, sometimes even 1:1,000. Bichloride of mercury in solutions of from 1:16,000 to 1:10,000 and protargol, 1:1,000 to 1:250, are also used. There is no given rule upon which to base a selection of one or the other of these remedial agents in the local treatment of chronic cystitis, as their beneficial effect is not constant for all cases, some being aided by one and some by another preparation. When after a long use of local treatment chronic cystitis seems to resist all the measures adopted, perineal cystotomy should be considered for the purpose of affording prolonged drainage to the inflamed organ. If this expedient be decided upon, the bladder should be opened by a central perineal incision, as described in the treatment of stricture; and if it be found that the bladder is covered with velvety granulations, the curette may be resorted to with perfect safety and often with excellent effect. If contracture and hypertrophy of the vesical sphincter be discovered, as is often the case, a rigid vesical orifice resisting the exploring finger, this obstruction, which explains the persistence of the chronic cystitis, should be cut down freely by a lateral incision with a long blunt-pointed bistoury introduced into the bladder under the guidance of a grooved director, the depth of the cut being estimated by a finger passed into the rectum, toward and upon which the incision is made.

## Gonorrhœal Epididymitis—Swelled Testicle.

Epididymitis, as a complication of gonorrhœa or urethritis, is more frequent in hospital than in private practice, where Bergh finds it in about seven per cent of the cases, while Taylor places it at not over two to three per cent. Like gonorrhœal cystitis, it may come on in regular sequence as a result of the gradual spreading downward of the urethral

inflammation, from the posterior urethra to the mouth of the ejaculatory duct, and thence through the vas deferens to the testicle. Its most common date of appearance, in the course of a gonorrhœa, is during the first three or four weeks.

The date of appearance of epididymitis, however, is by no means fixed. It may come on during the first few days as a result of irritating injections, and it may be encountered at any period later, or even at any time afterward during life. Stricture of the urethra, or rather posterior urethritis so constantly existing behind it, is a fertile source of epididymitis. Both testicles are attacked with equal frequency, but not simultaneously. Epididymitis is generally unilateral, and when both testicles are swelled one follows the other by an interval more or less long.

Generally, epididymitis is due to some direct exciting cause over and above the general inflammation of the urethra. Among such immediate causes may be enumerated most of those irritants, general and local, which have been referred to already as being capable of lighting up cystitis in a patient with gonorrhœa, such as injections too irritating in quality or thrown too deeply into the canal; the passage of a sound or other instrument, for exploratory or other purposes, down a urethra which is the seat of surface inflammation; sexual irritation of any sort; drinking; violent exercise, which may act by directly damaging the testicle mechanically, and thus, as it were, calling down the inflammation from the urethra.

Ordinary swelled testicle is usually a direct sequence of posterior urethral inflammation. This inflammation extends through the vas deferens, producing inflammation of the duct (deferentitis) and lodges in the epididymis alone (epididymitis) or occasionally extends farther into the testicle (epididymo-orchitis). A testicle once attacked by epididymitis is rather prone to relapse later on in life, more vulnerable, as it were, than its sound companion.

Epididymitis is accompanied by considerable swelling of the organ, firm, resistant, due to inflammatory exudation and interstitial changes, consisting chiefly in infiltration of lymphatic cells. This condition may involve the testicle and the vas deferens. There is generally effusion into the tunica vaginalis and sometimes active inflammation of its walls. Abscess may result, but is infrequent. Examination of the serous fluid in the tunica vaginalis has revealed the presence of pathogenic micro-organisms and sometimes the gonococcus, but this latter does not play the most important etiological rôle in this complication.

**Symptoms.**—When acute epididymitis is about to attack a healthy testicle, sometimes signs of warning may be appreciated twenty-four hours before the testicle begins to swell. The first sign is generally an uneasiness referred to the depths of the groin, upon the side about to become affected, with a sense of weight and uneasiness in the testicle of

that side, which is usually already somewhat over-sensitive to handling. With these symptoms there may be some general malaise, a little constipation, slight headache, a trifling fever.

These symptoms are quite apt to come on in the afternoon after a day of ordinary exercise.

The patient naturally keeps still with the pain in his groin or testicle, and the rest of an evening, or a night, or both, often makes him so comfortable that, upon awaking the next morning, he may not be conscious that he has any unusual pain until he is upon his feet—possibly not then. Indeed, after quite a marked prodromal stage, a night's rest sometimes dissipates the pains, and the patient becomes and remains well.

This fortunate result is rare. Generally, as the day goes on, the pain in the groin becomes more intense, the testicle rapidly or gradually grows heavy, hot, and painful. The enlargement usually commences in the upper and back portions—the globus major—and runs down the body of the epididymis; sometimes the lower part or globus minor is first involved.

The portion affected is acutely sensitive to pressure; the remainder is not so. At this stage the different divisions of the epididymis and its separation from the body of the testicle can be readily marked out.

Inflammation and swelling of the cord may occur simultaneously with that of the epididymis, or later on. There may be a sharp chill, followed by intense fever, nausea, headache, and vomiting. Constipation is apt to be present, and sometimes there is a tendency to frequency in urination, with more or less pain in the act.

The flow of pus from the urethra becomes diminished, or stops entirely, to the delight of the patient, who indulges in the vain hope that that part, at least, of his misfortunes at last is over. The relief from urethral trouble is only transitory, and the discharge will return as the inflammation in the testicle subsides.

The fever increases at first as the testicle swells, and to the intense and increasing pain in the groin is added often an intolerable splitting pain in the back, low down. Meantime as the testicle increases in all its dimensions, fluid generally collects in the tunica vaginalis, keeping the testicle oval in shape. The scrotum gets red and hot, and is sometimes the seat of a very considerable œdematous effusion.

The intensity of the symptoms, and the height to which the inflammation reaches, vary greatly in different cases. There may be nothing more than a little tension of the epididymis, the size of a hickory nut, most marked posteriorly, lasting only a few days, and totally relieved by the recumbent posture, if the testicle be at the same time elevated and supported. On the other hand, the suffering may be intense, the scrotum hot, red, and shining, the pain in the groin and back excruciating, the tunica vaginalis tense and full of fluid, the substance of the whole testicle

seemingly in a state of most active inflammation, and this condition is not relieved either by position or by support to the testicle. In such severe cases the body of the testicle probably participates in the inflammatory condition (epididymo-orchitis) as well as the tunica vaginalis (vaginalitis) and the vas deferens (funiculitis, deferentitis). The swollen cord may be felt running up the groin, where it is excessively sensitive to pressure. In epididymo-orchitis there is an increase in the testicular swelling and a greater amount of serous effusion into the tunica vaginalis; the anatomical boundaries cannot be distinguished and the general swelling becomes very great.

First attacks of epididymitis, like first attacks of gonorrhœa, are usually much more formidable in their symptoms than subsequent visitations of the same malady. In the subacute form of epididymitis, especially in a testicle which has been the seat of former attacks, the whole malady may consist in a hard lump, which appears at the globus minor or major, attended by more or less pain, dragging, and constitutional symptoms. This lumpiness usually remains long present, perhaps for months or even years, becoming finally almost or quite insensitive, and not responding at all to medication.

In the acute cases it generally takes from two days to a week for the increase in size of the testicle to reach its height, after which the swelling goes down—at first slowly, then quite promptly, so that in ten days or two weeks, under treatment, it may be counted upon with reasonable certainty that the most desperate case will be practically well—that is, free from pain to such an extent that it may be supported in a suspensory bandage, or at least strapped, and thus the patient be allowed to get about in comfort.

**Complications and Sequelæ.**—Epididymitis may attack the undescended testis. The gland may have reached the inguinal canal when its recognition is not difficult, or it may not have left the abdominal cavity. In the latter instance general peritonitis is a possible result.

*Abscess* complicating epididymitis is uncommon except in the case of old men with prostatic disease. Its occurrence in the young suggests the existence of a tuberculous diathesis. *Gangrene* of the scrotum is phenomenal. It occurs only in connection with a morbid constitutional disorder, such as Bright's disease or diabetes.

*Atrophy* of the testis is reported in a few cases as a sequel to epididymitis, and hypertrophy is somewhat more common, especially after recurrent attacks. If there be atrophy there must have been also orchitis. Chronic infiltration of the epididymis often remains behind for an indefinite period, and in some individuals this hard focus relapses into a subacute epididymitis from time to time. It is probable in such instances that there is coexistent chronic inflammation of the seminal vesicle or prostate, or both. *Chronic hydrocele* is also favored by this

inflammatory induration, and is not infrequently found as a sequel of swelled testicle.

*Neuralgia*, amounting to paroxysmal pain or constant acute sensitiveness of the organ itself or in the region of the cord, reflex neuralgic pains, sometimes of a very intense character, radiating along the course of the lumbar and sacral nerves, are common sequels of epididymitis, especially in neurotic subjects and when chronic thickening remains.

*Azoospermia* occurs as a sequel to bilateral epididymitis, producing sterility. An acute attack of the affection, if it passes over within a reasonable time, leaves no injury to the epididymis behind it; but the subacute attacks—those characterized by localized large nodular developments in the tail or head of the epididymis—are apt to fail to get entirely well, and as a consequence the convoluted tube constituting the epididymis becomes obliterated at the point occupied by the nodule, and the passage of spermatozoa through it becomes mechanically impossible.

Inflammation in the epididymis results in plastic exudation. The calibre of the tube becomes filled up as the morbid process advances, and the connective tissue in which the tubes lie becomes the seat of a similar plastic inflammation. This process thickens the whole epididymis by new connective-tissue deposits, and fuses together into a solid mass the convolutions of the canal of the epididymis. The canal shows irregular dilatations and contractions at the seat of the lesion; caseous degeneration may subsequently attack the whole mass, and in cachectic or tuberculous subjects tuberculous infiltration may supervene. Gosselin pointed out that localized epididymitis of the tail of the testicle was more apt to produce sterility than when the head of the epididymis alone was involved in the disease, the reason being that many tubes unite to form the globus major, while the globus minor is composed of the convolutions of a single tube.

The sterility encountered after gonorrhœal epididymitis is present only when both testicles have been diseased, and not necessarily then. This sterility has no connection with impotence. The patient's virile powers are as strong as ever, his sexual act is perfect. Yet the fluid ejaculated is not healthy sperm. It has the spermatic odor but is watery in quality, and apparently composed entirely of fluids from the seminal vesicles and from the prostatic follicles, and when careful microscopic examination has failed to detect any spermatozoa, the patient is necessarily sterile, although he is not at all impotent.

Time may effect a cure in some cases in which absorption of the inflammatory thickening takes place, but usually neither time nor treatment is of the least avail.

Many patients, knowing that prolonged chronic epididymitis on both sides is liable to entail the loss of the power of procreation, may come to

demand an opinion as to their capacity to beget a child. The only grounds upon which such an opinion can be honestly rendered are (presumptive) the existence of a lumpy indurated condition of the epididymis on both sides, and (positive) the entire and continued absence of spermatozoa from the spermatic fluid.

**Treatment.**—Here, as in all the possible complications of urethritis, "an ounce of prevention is worth a pound of cure." A snug suspensory bandage should be worn, and all such exercise as might jolt or bruise the testicle must be strictly enjoined. The patient should be kept particularly quiet during the acute periods of the urethral discharge, and cautioned against the least approach to sexual excitement. All those articles of food or drink which are known to increase the intensity of the urethral inflammation also tend to produce epididymitis, and must be avoided; and much care is necessary in the selection of proper injections, as well as in the manner of administering the latter.

The treatment of epididymitis varies somewhat with the grade of intensity of the inflammation. During the premonitory twenty-four hours, when the principal complaint is of a slight weight or dragging at the cord in the groin, with perhaps some discomfort in the testicle and a pain in the back, a strong solution of guaiacol, from twenty-five to fifty per cent, and sometimes pure guaiacol applied to the scrotum over the site of the swelling may produce prompt and marked relief. This remedy may be combined with glycerin or vaseline in the above proportion. The pain attending an application of pure guaiacol is very intense in most cases. Unless under the guaiacol the symptoms shall have abruptly subsided, it is proper to put the patient to bed upon his back, to administer a brisk laxative, and to sling the testicle well up so that the cord may be entirely relieved from its weight, while the return circulation from the testicle is favored by gravity.

This slinging-up of the testicle is a most important matter during all stages of the treatment of the malady under consideration. It cannot be effected by means of the suspensory bandage. Such a bandage lets the testicle drop between the thighs, and, although it is useful in the erect posture, it loses its value entirely when the patient lies down.

An excellent means of suspending the testicles is that employed in most hospitals. It is quite effective, but is unfortunately dirty. It consists simply in cutting a strip of ordinary adhesive plaster, four or five inches broad and long enough to stretch from one side to the other over the tops of the two thighs, just beneath the scrotum, as the patient is lying down. A crescentic piece should be cut out of the plaster to prevent it from cutting the root of the scrotum. It is applied by being fastened securely in place, the adhesive side sticking to the skin on the outer aspect of both thighs as they lie close together, the scrotum and inflamed testicle meantime having been drawn well up out of the way, to

be afterward gently deposited upon the tense, smooth, dry table formed between the thighs by the non-adhesive side of the plaster (Fig. 55).

The plaster is rather dirty, the legs are constrained, the top of the plaster sometimes cuts into the root of the scrotum; but the bandage does not slip, and the support is quite efficient.

Another method of making support, and one which applies to all cases whether or not poultices or other dressings are to be used, is the following: a large handkerchief—preferably of silk—is to be folded into a triangle. At the centre of the base of this double triangle, opposite

FIG. 55.—Plaster Support for Suspending Testicle in Bed, and Elastic Pressure.

the right angle, a double piece of tape, about three feet long, is to be sewed. An ordinary stiff roller bandage is drawn quite snugly around the waist above the flare of the pelvic bones and secured by safety-pins. Then the patient is instructed to hold the testicles and scrotum well up above and over the symphysis pubis. The centre of the long side of the triangular silk handkerchief, marked by the tapes, is now placed in the perineum well up against the root of the scrotum, and one end of it is carried up on each side along the fold of the groin under the roller bandage, after which both these ends are drawn upon so as to make the long side of the triangle sufficiently tense under the scrotum, and fastened into place with large safety-pins. Finally the two tapes are carried around the thighs on either side and under the roller bandage, where they are fastened so as to keep the perineal portion of the handkerchief fixed. The point of the triangular handkerchief is to be folded over and loosely

pinned up to the roller bandage in front, to retain in place any dressing which may be put upon the testicle.

Some authorities advise ice, and its application is very simple. It is only necessary to separate the thighs and place the inflamed testicle upon a suitable cushion, after which broken ice, floating in its own water contained in a rubber or oil-silk bag of ample size, is placed upon the testicle and cushion. Ice is useful in intense neuralgia of the testicle, but useless if not harmful in most inflammatory conditions.

By way of internal medication the following combination may be given:

℞ Tinct. phytolacca decandra, . . . . . gtt. x.–xxx.
Iodine-vasogen (6 per cent), . . . . . gtt. xv.
Given in milk three times daily after meals.

The former drug is intended to lower arterial tension in the inflamed organ and the iodine to assist in the removal of the fluid contents of the tunica vaginalis. This special preparation of iodine consists of free iodine in a hydrocarbon oil, and is absorbed by the system with marked activity.

Numerous internal remedies have been at various times advocated in the treatment of epididymitis. None of them has held place. The continued nauseant influence of frequently repeated small doses of tartar emetic has proved of no value. Pulsatilla has been loudly vaunted, splendid effects being claimed for it in doses of one-tenth of a minim often repeated up to one drop three times a day. It has failed in most hands, employed either to check the pain or to modify the course of the malady. It is well to correct the strong tendency to constipation which generally exists in the disease by the daily use of gentle laxatives; and on the few occasions when the pains demand it, there is no objection to the administration of a small amount of codeine or other gentle anodyne.

Leeches upon the scrotum do not afford any considerable relief and their use is attended by obvious disadvantages. When the testicle seems to be strangulated by the intensity of the inflammation, a large number of leeches—ten to twenty—placed over the upper part of the scrotum and along the course of the cord, will sometimes afford relief from the immediate and excruciating pain; but puncture of the tunica vaginalis will afford similar relief and is to be preferred.

In all acute cases of epididymitis there is more or less effusion of serum into the cavity of the tunica vaginalis, making an acute hydrocele, the size of which is sometimes considerable, generally unimportant. When the tension within the testicle is great and the effusion considerable, relief may sometimes be promptly afforded the patient by resorting to puncture of the tunica vaginalis. A number of punctures may be made subcutaneously with a fine, sharp-pointed knife, so that the fluid may escape into the meshes of the connective tissue of the scrotum, or the

serum may be drawn off by aspiration. After aspiration the cavity may refill, but often the acuteness of the pain subsides after a single puncture, and the subsequent collection of fluid may be disregarded. When the tunic is not distended, its puncture does not afford relief—as might be inferred.

This operation is entirely devoid of any risk or danger, and is justifiable under all circumstances of distention of the tunica vaginalis in connection with acute inflammatory disease.

The sheet anchor of treatment in epididymitis, however, is the local use of hot fomentations or poultices. Belladonna and opium in different forms, as hot decoctions and infusions, have been employed, but they possess no advantage over tobacco and flaxseed. Tobacco is undoubtedly a filthy substance, but it may be so managed that the patient is little, if at all, soiled by it. Excoriations of large size upon the skin of the scrotum contraindicate the use of any narcotic or anodyne in the poultices, which must then be composed of some simple material.

To make a tobacco poultice which shall be at once efficient and clean the following course may be followed: one ounce (a paper, as ordinarily sold for chewing) of fine-cut tobacco is to be finely shredded into a tin or earthen vessel containing from eight to ten ounces of boiling water. Into this is put a tablespoonful of glycerin or of sweet oil, and into the whole, while being rapidly stirred, is mixed a powder of equal parts of ground elm bark and ground flaxseed, in sufficient quantity to bring the whole mass to the proper consistence for a soft poultice. Some patients manifest disagreeable sensations due to the effect of tobacco absorption, in which case the latter should be removed from the poultice.

Plain flaxseed poultices may also be used in place of the tobacco combination.

Whatever is used should be placed between two layers of cheese-cloth, and after being put around the testicle, should be surrounded by absorbent cotton to help retain the heat, and covered over with a piece of oil silk to protect the bed clothing.

The poultice when made should be perfectly moist, soft, and smooth, but should not drip. It should be large enough to cover the entire testicle—indeed, the whole scrotum. It must be applied as hot as it can be borne and renewed every one or two hours.

It is well in all cases bad enough to confine the patient to bed that the poultice should be applied at once as soon as the testicle is suspended. It often succeeds in relieving the testicle within a few hours and in entirely overcoming the pain. In all very acute or intense cases, however, this effect cannot be expected before the lapse of two or three days, possibly longer.

The vast majority of cases of epididymitis call for no further treatment during the *acute stage* than the simple means already enumerated: mild laxatives, an elevated position of the testicle with the patient upon

his back, and the continuous use of poultices. Under these means the acute symptoms pass off in a period varying from a few hours in mild cases to a few days, all pain disappearing at the very outside in two weeks in the worst cases. Generally the patient who lies down at once, even with a very severe first attack of the disease (which is the worst he can have), may be assured that he will be out and attending to his business in ten days, and this period under good management may often be shortened to a week, while cases which last only from twenty-four hours to three days are by no means uncommon.

When the acute symptoms subside, however, the patient is not well. The pain usually subsides entirely in from one to three, or possibly five or six days; but long after the patient ceases to feel pain the swelling

FIG. 56.

remains, and the dragging upon the cord by the weight of the testicle in the erect position brings on acute pain. It is at this stage that properly applied pressure renders distinct service in reducing the swelling and lessening the tenderness of the organ.

Should a patient find it necessary to leave his bed before completing his week or ten days, and not be able to wait until he can stand erect for fifteen minutes without pain, he may do so by the aid of strapping or elastic compression. Just as soon as the acute symptoms are fairly on the decline and the testicle can be handled, even although it be with pain, the patient may get up and go about with safety, so far as relapse is concerned, if the testicle be properly strapped. The first straps should be put on with great gentleness and not too tightly. The patient must be directed to stay in bed, and to remove the straps or to cut them down the front, if the testicle be not quite comfortable in half an hour after the straps have been applied.

The straps composed of rubber plaster are required to be carefully applied and sometimes cause trouble in being removed, it being necessary to soak them off in hot water if the plaster is very adherent. Another method of obtaining the benefit of compression of the swollen testicle after the tenderness has subsided, and one which is equally satisfactory and much less troublesome, is elastic pressure procured with a section of a rubber elastic bandage about three inches wide and six to seven inches long. Attached to one end of this is a narrow strip of rubber adhesive plaster about one-half inch wide and long enough to go once around the

testicle and overlap. This plaster is intended to hold the rubber bandage in place after it has been applied (Fig. 56). This is accomplished as follows: The swollen testicle is pulled down slightly and the sound one is pushed upward against its ring; the free end of the rubber bandage is applied to the surface of the organ and the rest is used to encircle it, being applied with sufficient tension to procure moderate pressure. The bandage is finally held in place by wrapping around it the rubber adhesive strip (Fig. 55). The even elastic pressure thus attained acts most promptly upon the swelling and never produces any trouble. The bandage tends to contract with the testicle, and may be readjusted when necessary. By the use of such means of compression the acute stage of the attack is liable to be shortened and the patient likely to get about sooner than without this expedient. In cases in which the testicle will stand the pressure without undue pain, it may be applied while the patient is still confined to bed, in conjunction with the poultices, and thus curtail the duration of the attack.

Chronic relapsing epididymitis may be treated by vasectomy (ligation of the vas deferens) on the affected side. The authors have performed this operation in a number of instances, with the result of a permanent cure in every case. One case was bilateral and had double hydrocele.

The operation is simple, and may be done over the external ring or in the median raphé of the scrotum; in either of which locations the cord is readily found, the vas deferens separated, and a small piece, about one-fourth of an inch, resected between two ligatures.

# CHAPTER VI.

## STRICTURE OF THE URETHRA.

A COMMON consequence of gonorrhœa in the male is stricture of the urethra. True stricture, a narrowing of the calibre of the canal, the result of inflammatory exudation and cicatricial contraction, also may be due to other causes, such as traumatic violence of any sort, mechanical or chemical. Congenital imperfection of the urethra, more common at the meatus, producing a constriction of the canal, has been called "*congenital stricture.*" It differs from true stricture in that it does not contract, but remains as congenitally formed. It therefore might be termed for distinction congenital stenosis. The term "*acquired stricture*" embraces the various other forms, such as *organic*, *traumatic*, *spasmodic*, and *inflammatory*. *Organic stricture* occurs as a result of acute inflammation of or injury to the canal, and represents what is meant by true stricture.

*Traumatic stricture* is included in the previous classification, but is of non-venereal origin.

The term "inflammatory stricture" denotes a constriction produced by soft inflammatory cellular infiltration, which may be absorbed or may go on to form true fibrotic stricture. It also signifies simple inflammatory, œdematous, and congestive swelling enough to diminish the calibre of the canal. This is in no sense a true stricture.

### SPASMODIC STRICTURE.

"*Spasmodic stricture*" may depend upon a multitude of causes, general as well as local, moral as well as physical. Moreover, it may complicate the other forms of stricture of the canal and give to them an importance which they would not otherwise possess. Spasmodic action of the muscles of the deep urethra produces an obstruction which may result in retention of urine; but as the cause may exist outside the urethra, being reflex, and as this condition sometimes coexists with true stricture, it is more properly designated *urethral spasm.*

Urethral spasm or "spasmodic stricture" is generally capable of very easy demonstration. A personal case will well illustrate this.

A young man, under twenty years of age and perfectly healthy so far as urethral or antecedent venereal disease of any kind was concerned, finding some pediculi upon his pubes, was kindly supplied with a lotion by an obliging friend with which to kill them. This he applied faithfully

in the morning. The lotion, which was a simple tincture of delphinium, proved quite irritating, and presently occasioned much tingling and burning of the skin where it had been applied, and brought on a desire to urinate; but the patient, to his surprise, found that he could not void a drop of urine, the bladder being only slightly distended.

He continued up and about all day, making repeated but absolutely futile efforts to empty his bladder, and finally sought relief late in the afternoon, when a full-sized olivary soft catheter was readily passed into the bladder, encountering no obstacle, and a clear, bright stream of urine gushed out in torrents through the instrument to the amount of more than a pint.

The patient passed water voluntarily in the evening before retiring, and has had no further trouble.

This case was certainly one of spasmodic contraction of the muscles of the deep urethra, due to irritation reflected from the skin. There was no present or past malady of the bladder or urethra, and has been none since. Efforts were made in vain by the patient to empty his bladder during all stages of fulness. There was not a particle of atony in the case, for, as soon as the urine found a hole from which to escape, it gushed forth under the powerful contraction of the detrusor, and did not dribble away sluggishly from the end of the catheter, as it is wont to do in cases of atony, unless aided by the efforts of the abdominal muscles. The stream in this case continued with equal force and vigor up to the last few drops. Here, then, is a case of pure reflex spasm of the urethra.

In February, 1896, a patient called upon the authors, having had several attacks of complete retention of urine. He had reached the age for prostatic hypertrophy, and had been told that such was the cause of his trouble. Indeed he had just come away from a Brooklyn hospital because orchidectomy had been proposed, which he had rejected. Examination revealed that there was no undue frequency of urination by day, nor even at night; that the bladder emptied itself completely, and that each attack of retention had been relieved instantaneously by the single passage of a catheter, and was separated by a long interval from each previous attack. Exploration of the urethra demonstrated the existence of a true organic stricture, but one which was quite permeable. The prostate was practically normal. The retention of urine had been caused by spasmodic contraction of the deep urethral muscles--urethral spasm—complicating true organic stricture.

Tuffnell reports a case in which a patient had a stricture deemed impassable (doubtless because fine bougies only were used in attempts to pass it). This patient suffered so much that a day was appointed upon which perineal section should be performed; but before the date arrived he passed some links of tapeworm, unsuspected before, and, as a part of the preparation for his operation, a medicine was given to dislodge the worm. This proved successful. The worm was passed, and with it

the impassable stricture disappeared, and the patient urinated freely at will.

It has occurred several times in our experience for a surgeon to make a diagnosis of tight stricture in a given case, and to find his filiform bougie—which he has passed with difficulty—grasped, as he attempted to withdraw it, when there has been nothing more in the case than spasmodic contraction of the deep urethra, as proved by the fact that a well-warmed, large, blunt steel sound, held gently against the face of the obstacle, has after a short delay, slipped, by its own weight, smoothly into the bladder.

Regarding the location of urethral spasm it is probably found only in the membranous portion; and although some authors have claimed its existence in the anterior canal, Guyon has demonstrated by the application of the electric current that no spasmodic contraction of this region occurs. In some cases it is quite difficult to distinguish between urethral spasm and a stricture situated at the bulbo-membranous junction. The resistance of the latter is firm, tense, abrupt, as contrasted with the muscular contraction which is softer, more yielding, and elastic.

If a blunt steel instrument be held firmly against the face of a "spasmodic stricture" with gentle but persistent pressure, the contraction often yields suddenly and the instrument enters, causing a certain amount of pain; but in the case of true stricture the resistance is firm and unyielding, and is not suddenly overcome by the gentle force of an instrument larger than the calibre of the stricture.

The attendant symptoms will render additional assistance in distinguishing between these two conditions. In the case of urethral spasm the evidence of urinary obstruction is of an irregular character. Sometimes the difficulty lies at the commencement of urination, while the continuation of the act is normal. Again, an effort is required to pass the water during the entire act, or the stream may be abruptly interrupted before the bladder is emptied; while in other cases partial or complete retention may occur. The presence of urethral spasm is clearly demonstrated when the functional difficulty is not constant but variable, and an attempt to pass a small bougie is unsuccessful. An organic obstacle, if small enough to obstruct the bougie, would yield constant symptoms. When even the smallest instrument will not pass in the case of spasm, a very large blunt steel sound will sometimes enter without hesitation or delay.

The causes of urethral spasm are direct and indirect. Who is unfamiliar with the effect of shame, haste, anxiety, anger, nervous excitability, and other emotions in making it absolutely impossible for a perfectly healthy patient sometimes to void water at all for a considerable time? Such retention is due to a spasm of the urethra. Of the various local causes of "spasmodic stricture" may be mentioned cystitis

of the neck of the bladder, posterior urethritis, stone in the bladder, irritation about the rectum, and trouble in the anterior urethra, acute inflammation, organic stricture, and contracted meatus. The grasping of a sound by an organic stricture, through which the instrument has been passed, is due to spasm. The lack of co-ordination between the detrusor and the cut-off muscles, often leading to retention in cases of locomotor ataxia and partial paraplegia (especially syphilitic), acts apparently by causing spasm of the deep urethral muscles. The different conditions in which deep organic stricture habitually finds itself —sometimes allowing a reasonably free stream of urine to pass, again so nearly closed up that only a few drops can be painfully voided with great effort—are undoubtedly due more often to spasm than to any purely inflammatory change in the stricture itself. That form of partial or complete retention sometimes seen in connection with a very slight stricture of large calibre, either in the deep or in the pendulous urethra, is certainly due to spasm of the membranous sphincter, as proved by the ease with which many of these cases allow the passage of a large-sized steel instrument without the employment of any force.

**Treatment.**—The surgeon's tact and ability are often taxed to discover the cause of deep urethral irritability and spasm. To be successful in his treatment he must find the cause; when that is removed the "stricture" will get well. The cause may lie in a tight meatus, or in an irritable anterior or posterior stricture of large or small calibre, which will require appropriate treatment.

Sometimes the passage of a large-size catheter or a well-oiled sound will result in the instant relief of the difficulty, and the same result may be brought about by means of a hot sitz-bath.

## Organic Stricture.

**Etiology and Location.**—Most cases of organic stricture owe their origin to gonorrhœa, and it is that form which is commonly referred to in speaking of stricture of the urethra. Injury to the urethra resulting in complete rupture of the canal, or lacerations and abrasions of a lesser degree, blows or falls upon the perineum, forcible bending of the penis during erection, may all be followed by the production of organic stricture.

When stricture of the urethra results from gonorrhœa it is due rather to a long-continued inflammatory process than to an inflammation intense in character but short in duration. The development of stricture is generally slow. It is seldom encountered much before the second year following gonorrhœa, although there are marked exceptions. The growth of stricture is also dependent upon the nature of the original lesion. In traumatic stricture the period is shorter than that following inflammation

of the canal. Sir Henry Thompson, from an observation of 164 cases, found that about one-sixteenth of this number had developed in less than one year from the urethritis, about three-fourths of this number between one and four years afterward, and that the balance was equally divided between periods of seven and eight years and over twenty years.[1] Guyon finds from an observation of 142 cases the following order of frequency: During the first year, 4; from first to second year, 10; second to fourth year, 20; fourth to sixth year, 19; sixth to eighth year, 24; eighth to tenth year, 16; tenth to fifteenth year, 49. Thus it appears that in a majority of instances stricture in his experience is detected between two and ten years after the original inflammation.

Stricture may occur at any age, is seldom found in very old men, and is most common between the ages of thirty and forty.

Regarding the most common location of stricture Taylor,[2] in a classification of 250 personal cases, finds 62 per cent in the sinus of the bulb, 20 per cent in the middle of the pendulous urethra, and 18 per cent in front of the latter region. These may be designated regions one, two, and three, from behind forward.

Taylor's tabulation is simply a ratification of Sir Henry Thompson's observations. Thus it may be roughly stated that over sixty per cent of cases of stricture exist in the region lying between the bulbo-membranous junction and the peno-scrotal angle, and that the remaining cases are about equally distributed throughout the rest of the anterior canal.

Stricture of the prostatic urethra does not occur as a result of gonorrhœal inflammation. The best observers also state that stricture of the membranous urethra does not occur from the same cause, but that this portion of the canal is more apt to be dilated, as well as the prostatic portion behind an organic stricture involving the section of the urethra anterior to them.

In examining the urethra according to the divisions specified, it has been found by many observers that in the majority of cases only one region is involved. In some instances the stricture invades the two regions in front of the peno-scrotal angle (Fig. 57) or the two consecutive regions between the bulbo-membranous junction and a point two and one-half inches from the meatus, but only exceptionally does stricture occur near the meatus in conjunction with stricture in the bulbous urethra without involving the intermediate portion. Such records seem to show that a single stricture is the rule and that multiple stricture is the exception. Other observers claim the opposite of this rule; but with the present knowledge of the pathological formation of stricture tissue, it can be understood how in exploring the urethra the conclusion that multiple stricture existed might be reached, from the fact that an exten-

[1] Desnos: "Traité élémentaire des Maladies des Voies urinaires."
[2] "Venereal Disease," 1895.

sive area infiltrated with fibrous tissue must vary at different points in the degree of the existing stenosis (Fig. 57). In other words, a stricture commencing in any part of the spongy urethra may reach the maximum

FIG. 57. — Annular Stricture of the Anterior Urethra covering an Extensive Area.

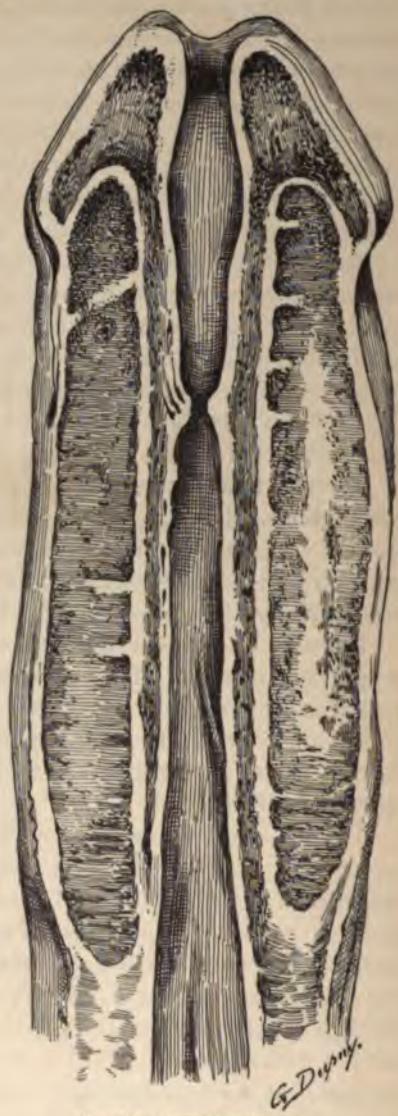

FIG. 58.—Linear Stricture.

degree of contraction at the bulbo-membranous junction; or, on the other hand, on account of an increase of deposit of cicatricial tissue at one or more points anterior to the bulb, the exploring instrument would detect what seemed to be more than one strictured point.

The formation of stricture is variable, and depends upon the character and extent of the pathological changes in the course of the canal. Thus, when there exists an infiltration of the connective tissue sufficiently dense to cause a stenosis of the calibre, but before fibrous tissue has been formed, such a condition is spoken of as *soft stricture*. When the fibrous element has sufficiently invaded the softer structure at the further expense of the normal tissue, the lesion is called a *semi-fibrous* or *fibrous stricture* according to the degree of thickening. Finally, when this process extends itself still farther so that the normal tissues are entirely obliterated and sclerotic and atrophic changes occur, yielding a firm and indurated structure, the so-called *inodular* stricture is the result.

FIG. 59.—Inodular or Tortuous Stricture.

These pathological changes, as they involve greater or less areas of the canal, and are accompanied by more or less stenosis in different portions, represent the various types of stricture under the different clinical appellations. Thus a *linear stricture* is a band of fibrous thickening with a maximum narrowing at one point (Fig. 58); *annular stricture*, the same condition covering a broader surface, sometimes involving several inches of the canal (Fig. 57), while an extensive distribution of the nodular tissue around an irregular channel results in what is called *inodular* or *tortuous stricture* (Fig. 59).

For purposes of classification it is customary also to divide strictures with regard to the degree of stenosis into strictures of large and small calibre. Such a distinction is of course simply an arbitrary one and is governed by no established standard. It is generally understood that a stricture which will permit the introduction of an instrument 5 mm. in diameter (15 French) or larger may be considered one of large calibre, while anything below this is regarded as of small calibration.

In order to determine whether or not the urethra is the seat of a narrowing such as should properly come under the title of stricture it is better to have in mind a popular standard for the normal urethra to compare with. Any pronounced variation below the natural calibre must be considered a "stricture of the urethra." It is important, however, in determining the natural calibre of the urethra to bear in mind that there normally exist anatomical points of narrowing, and that between these anatomical points the urethra may be dilated beyond what should be regarded as its normal calibre (Fig. 60).

The objection to the division of strictures into those of small and large calibre is that unless the standard be placed at a reasonable size strictures of large calibre will undoubtedly oftentimes be discovered at one of the points of physiological narrowing. The objection is properly raised to the scale given by Otis, which recognizes a definite relation between the circumference of the penis and the calibre of the urethra, that it is too dogmatic and represents more accurately the distensibility of the urethra than its normal calibre.

The scale adopted by Otis is shown in the following table:[1]

TABLE SHOWING THE RELATIVE CIRCUMFERENCE OF THE PENIS AND URETHRA.

| Circumference of Penis. | Circumference of Urethra. | Circumference of Penis. | Circumference of Urethra. |
|---|---|---|---|
| 3 inches, or 43 mm. | 30 mm. | 3¾ inches, or 93 mm. | 36 mm. |
| 3¼ " " 81 " | 32 " | 4 " " 100 " | 38 " |
| 3½ " " 87 " | 34 " | 4¼ to 4½ inches, or 106 to 112 mm. | 40 " |

In employing the above scale for estimating the normal calibre of the urethra Dr. Otis has devised and recommends the urethrometer, an instrument for exploratory purposes, having a hinged extremity which can be expanded to a bulbous shape between sizes 20 and 45 French (Fig. 66, p. 121), but when any urethra is explored with this instrument and in accordance with the above table it is hardly possible that it will be found free from some variation in its calibre and therefore will be considered as the seat of stricture, a conclusion the acceptance of which must lead to a most indiscriminate and unnecessary interference either by cutting or by overdistention. A conservative estimate of the average size of the canal in the majority of cases places the normal calibre at about 28 or 30 French,

[1] Otis: "Stricture of the Urethra."

and while exceptionally it may be somewhat above or below such a standard, the greatest satisfaction has been attained by those observers whose experience permits them to express an authoritative opinion in the acceptance of this standard both for exploring the urethra and in the treatment of stricture.

The meatus externally and inside the orifice is the most commonly constricted point and is subject to considerable variation. It is here that congenital narrowing is so prone to exist that it has led to the expression of "congenital stricture." The meatus is sometimes found sealed up to the size of a pinhead, livid in color and conical in shape, manifestly unnatural, and from this size upward it is found of all sizes, sometimes altogether disproportionately large as compared with the rest of the canal. This smallness, which is a congenital deformity and not a pathological condition, never calls for interference on the part of the surgeon unless it be presumed to be the probable cause of symptoms such as reflex spasm of the membranous sphincter, or unless it interferes by its smallness of size with the proper treatment by instruments of morbid conditions more deeply seated. About the middle of the spongy portion, from two to three inches from the meatus, there exists in a large percentage of individuals another point of physiological narrowing which is often designated a stricture of large calibre by those who examine the urethra according to the scale of Otis and with the idea that it should possess a uniform calibre throughout its whole course. Behind the strictured meatus we have a dilated area known as the fossa navicularis. Another dilated cul-de-sac exists in the sinus of the bulb, in front of the triangular ligament, the location of which is readily recognized by the introduction and withdrawal of an instrument, especially a bulbous bougie, and at the triangular ligament is another point of physiological narrowing which should not be mistaken for stricture. Besides these common points of constriction and dilatation throughout the course of the pendulous urethra there undoubtedly exist many other variations from the maximum and minimum calibre, so that in exploring the urethra the larger the

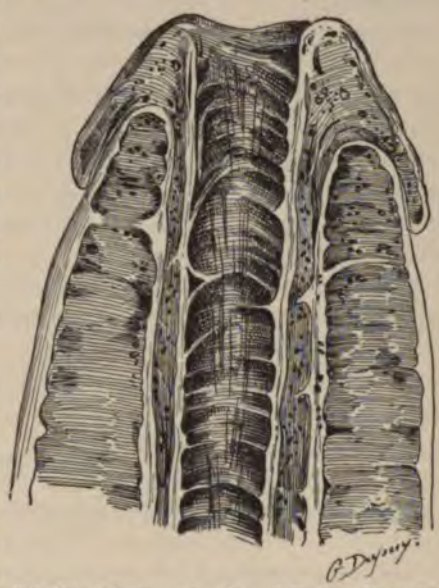

FIG. 60.—A Portion of a Normal Urethra Distended with Air, showing Transverse Bands.

instrument the more bands does it discover along the course of the canal (Fig. 60). Such points simply represent areas of uneven dilatability and will exist whether such an individual possesses a healthy urethra or is the subject of real stricture; whether he has suffered from no symptoms or has had gleet; whether his urethra has been cut internally or not, and whether or not his symptoms have yielded to treatment. Consequently the existence of these areas in the anterior portion of the urethra does not constitute stricture, and stricture may be cured while the areas still remain behind.

When gonorrhœal stricture occurs it has been pointed out by pathological observers that it generally involves the urethra over a large area; that there may be points at which exist greater degrees of contraction than others representing several of the transverse folds which have become infiltrated and consequently impinge on the calibre of the canal to a greater extent than the intervening portions. Such points are simply parts of the same lesion and should not properly be counted as separate strictures.

Traumatic strictures are generally limited in area and localized in one region, according to the seat of the injury, which is more commonly in the bulbous portion.

Cicatricial contraction due to chancre or chancroid usually is found near the meatus.

### Symptoms.

Strictures of wide calibre may give rise to spasmodic and irritable troubles in the deep urethra. When they do so act, however, they are themselves generally more or less sensitive and inflamed. Sometimes, on the other hand, especially at the meatus, such strictures are neither inflamed nor sensitive, and it becomes a doubtful question to decide whether they have anything to do with troubles deeper in the canal or not.

The vast majority of these strictures produce no symptoms whatsoever, excepting a slight gleet, and some of them not even that. Before deciding that a given tight spot in the urethra is the cause of other trouble deeper in the canal, it is wise to eliminate all other sources of such trouble, and not to jump at the conclusion that because there are bands in the urethra, and spasmodic or inflammatory trouble farther down, the latter necessarily depends upon the former, and will be relieved by a cutting operation. Such a doctrine must certainly sooner or later lead the young practitioner to the border-line of quackery, if not into its domain.

The most common symptom of strictures of large calibre in the pendulous or in the deep urethra, is a gleety discharge more or less purulent.

As stated above, stricture of large calibre may go for a long time undiscovered. Being of gonorrhœal origin its formation is usually slow.

As the strictured area contracts, the patient may become accustomed unconsciously to the slight effort involved during the act of urination and may fail to recognize any alteration from the normal state. A period is sooner or later reached when the patient becomes conscious of some modification either in the size or the shape of the urinary stream. This may be twisted or it may be uniformly small or flattened or may be expelled in two separate jets. Such changes in the volume and form of the stream are not invariably significant of the existence of true stricture, as they may be noted in acute and chronic urethritis, in prostatitis, and in urethral spasm, when the real calibre of the canal is determined by exploration and found to be normal.

Of much greater importance is the projectile force of the stream during the act of urination as an index of the tone of the bladder muscle; but even when there exists a marked contraction of the urethra due to stricture, the bladder having become reinforced by compensatory muscular hypertrophy may eject the stream from the urethra with reasonable force. Soon, however, the bladder becomes unable to compensate for the obstruction in the canal, the stream is not only much diminished in size but ceases to be projected to any distance from the end of the penis and either falls perpendicularly in a small stream or is voided by drops after considerable effort on the part of the patient. These symptoms denote tight organic stricture, and in this condition, as a result of catching cold or from the effect of instrumental examination, congestion of the surface of the stricture or reflex spasm of the compressor urethræ muscle is produced, from either of which causes the passage of the urethra becomes occluded and urinary retention occurs.

Urethral discharge, which is one of the earliest symptoms, more or less muco-purulent in character, is generally found in all cases of stricture of small calibre, but it may be entirely absent. The quantity of the secretion is generally scant, sometimes rather free. It is more commonly a morning drop but may also occur during the day. A free discharge is the exception rather than the rule, and the pus which is formed at the inflamed and congested area in connection with any stricture may simply appear in the urine in the form of shreds and masses.

There may exist a certain amount of uneasiness and smarting during urination in connection with strictures, but such subjective symptoms may be entirely absent.

Increased frequency and urgency of urination may be due to posterior urethritis or urethro-cystitis.

Strictures in any part of the urethra may be attended by pain felt either at the point where the stricture is located or referred to the meatus or to some other portion of the canal. Frequency of urination is much more marked when the deeper regions are involved, such urinary frequency being relatively greater by day than by night. Epididymitis,

sometimes acute and sometimes mild and relapsing, occurs in connection with strictures, notably those which are irritable, inflamed, or of small calibre and so situated as to affect the deeper portion of the urethra and the vesical neck. Retention of urine occurs with variable frequency. While it is more liable to complicate stricture involving the deeper regions, it may occur as a result of reflex spasm in connection with stricture in the anterior portion. Some patients are much more liable to be attacked by this symptom than others, especially those of a neurotic temperament, although anything which is likely to cause hyperæmia of the mucous membrane overlying the compressor urethræ muscle, such as cold or the passage of instruments, may be the means of provoking this complication.

The ultimate result of long-continued tight stricture is generally chronic inflammation of the bladder attended by thickening of the vesical wall, contraction of its cavity with contracture or sometimes dilatation and atony, resulting perhaps in constant dribbling of urine due to overflow of the distended organ and loss of power of the vesical and membranous sphincters.

Finally, as the result of tight stricture extends itself upward, dilatation of the ureter and pelvis of the kidney and pyelonephritis are brought about, which may lead at any time to a fatal issue by an attack of acute uræmia, or after a long duration to a slowly progressive condition of kidney insufficiency.

## Diagnosis.

The physical examination of the urethra is conducted by means of bougies of various kinds and solid steel sounds. These instruments are graded as to size in accordance with the different scales of measurement commonly in use, known as the French, English, and American. The relative sizes of these scales are shown in the accompanying table:

Table of the Approximate Relations Between the English, American, and French Scales.

| English. | American. | French. | English. | American. | French. |
|---|---|---|---|---|---|
| 1 | 3 | 5 | 12 | 14 | 21 |
| 2 | 4 | 6 | 13 | 15 | 23 |
| 3 | 5 | 7 | 14 | 16 | 24 |
| 4 | 6 | 9 | 15 | 17 | 26 |
| 5 | 7 | 10 | 16 | 18 | 27 |
| 6 | 8 | 12 | 17 | 19 | 29 |
| 7 | 9 | 14 | 18 | 20 | 30 |
| 8 | 10 | 15 | 19 | 21 | 32 |
| 9 | 11 | 17 | 20 | 22 | 33 |
| 10 | 12 | 18 | 21 | 23 | 35 |
| 11 | 13 | 20 | 22 | 24 | 36 |

The metal steel sounds (Figs. 61, 62) are blunt or conical at the extrem-

ity. The former are used for diagnostic purposes, the latter for dilatation. The reason for this is obvious. The shoulder of a blunt instrument can more readily detect the presence and the nature of the urethral obstruction, while the tapered sound can be more readily engaged in a narrowing of the canal and is better for dilating purposes. We are accustomed to employ in dilating the urethra a sound which is tapered in both directions, toward the handle as well as toward the extremity, the object of which is to avoid the continued distention of the meatus, especially when this part is constricted, while the deeper portion of the canal is being subjected to the required amount of distention (Fig. 67, p. 126).

Acorn-shaped bulbous bougies, the bougie à boule (Fig. 63), which are constructed of metal or flexible rubber, are preferable to the sound for exploring the anterior urethra. They readily detect the presence of strictured areas in entering the canal and upon withdrawal will carry upon the shoulder a drop of pus or blood as evidence of the inflamed area behind the strictured portion.

Flexible gum elastic olivary bougies (Fig. 64) may be used both for diagnostic purposes and also for dilatation.

FIG. 61. — Blunt Steel Sound. FIG. 62. — Conical Steel Sound.

Filiform whalebone bougies (Fig. 65) are very delicate whiplike instruments with straight and corkscrew ends

FIG. 63.—Flexible Bulbous Bougie.

used for the purpose of finding the orifice of strictures of very small calibre which are impermeable to any of the larger-sized exploring instruments, and having passed through the stricture into the bladder are employed as a guide upon which the tunnelled sound or catheter is passed either for the purpose of dilatation or to serve as a guide in incising the urethra through the perineum. Sometimes a number of these small filiform bougies are packed together in the urethra and then alternately manipulated until one shall have engaged and passed the obstacle (Fig. 69, p. 131).

By means of the endoscope or urethroscope the urethra may be inspected and the character and extent of a strictured area observed. While such means are useful and instructive for the purposes of study and scientific observation, from a practical standpoint the ordinary urethral exploring instruments are more useful for diagnostic purposes.

When a stricture of large calibre is important enough to yield any symptom besides the possible spasmodic and reflex irritative phenomena referred to and the gleety discharge, there are certain physical means of diagnosis which yield satisfactory results.

The physical diagnosis of stricture of large calibre is generally easy. A bulbous bougie (Fig. 63), metal or gum elastic, as large as the meatus will take, may be warmed, lubricated, and gently passed through the urethra. When it comes to a tight spot the surgeon can feel it as well as the patient, and when it is withdrawn the resistance is marked and the fibrous character of the tissue appreciated. If this spot be the seat of the gleety discharge, the bulb of the instrument is very often faintly tinged with blood at its tip upon withdrawal. Points of stricture are often sensitive; their length may be measured by the aid of this bulbous instrument and their number ascertained if more than one exist. This exploration refers only to the pendulous urethra.

FIG. 64.—Flexible Olivary Bougie.

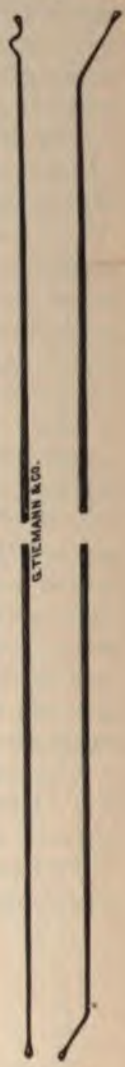


FIG. 65.—Filiform Bougies.

It is important to make a separate exploration of the anterior and posterior sections of the canal, and reach a conclusion as clear as possible regarding the front urethra before invading the posterior portion of the canal.

If, on attempting this exploration, congenital or pathological narrowing of the orifice of the urethra be found to exist, the canal may still be

explored without cutting the meatus by the use of the expanding urethrameter (Fig. 66) devised by Dr. Otis. This instrument is introduced closed, capped with a piece of thin rubber, down to the sinus of the bulb. It is there to be expanded until the patient feels a slight distention, and then to be slowly withdrawn toward the meatus. Upon en-

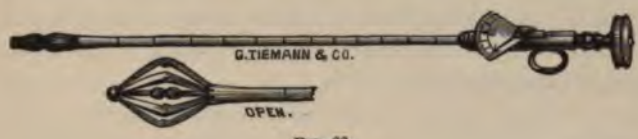


FIG. 66.

countering resistance the handle is turned so as to make the size of the bulb smaller, all changes in the bulb being marked upon an index-plate at the handle. The shaft of the instrument is marked in inches, and by its aid all constrictions in the canal may be located, measured, and calibrated.

In short, exploration by this instrument leaves nothing to desire, excepting a point of departure. Here, unfortunately, it fails, for it has to assume either that the size of some portion of the canal is the natural size of the whole course of the urethra (which is manifestly inaccurate, as as been shown), or the surgeon has to assume some arbitrary dimension as being the proper size of the urethral canal.

Moreover, with this instrument, damage is apt to be inflicted upon a sensitive urethra, which may and often does lead to an aggravation of all the symptoms for which the exploration was made, and to the lighting up of new ones. This instrument does excellent service at times, mainly in the way of accurately locating strictures in the pendulous urethra, which the surgeon has decided should be cut.

When, therefore, the meatus is small and the urethra has to be explored, the stricture of the meatus, and any tight spot within the first three-quarters of an inch from the meatus, may be cut at once as a part of the examination. If the meatus alone is involved, it may be cut down to the bottom of any pouch lying behind either of its angles, and fully two sizes (American scale) larger, for in healing it will contract somewhat, and it should be left so that when well it may be at least physiologically large. Any band smaller than the new cut meatus and lying near it should also be cut at the same sitting, as part of the examination.

This course is advised for several reasons. First, the urethra cannot be properly explored from before backward with a bulbous bougie, unless the orifice of the urethra will admit the passage of a fair-sized bulb and no organic stricture deeper seated can be treated with sufficiently large instruments unless the meatus is prepared for their reception.

The operation itself is trivial in importance, and never, when performed upon a urethra which would tolerate any interference whatever or was fit for any examination, has given rise to any complication or subsequent discomfort. The use of the sound upon the deep urethra after cutting the meatus is inadvisable, and may lead to disagreeable complications—cystitis, posterior urethritis, urethral chill.

The meatus then should be cut a little larger than full size, and the bulb, then introduced as through a natural meatus, will detect strictures in the pendulous urethra, if there be any.

Stricture of large calibre of the bulbo-membranous junction may be sought for with a blunt (not a conical), well-warmed steel sound, of a size as large as the anterior urethra will admit; and it is sometimes difficult to distinguish between true stricture and spasm. If there be spasmodic stricture, such an instrument will generally go in if properly handled.

The blunt sound, well warmed and lubricated, should be gently carried down the urethra and its beak presented accurately at the hole in the triangular ligament. Here it should be held under even pressure—rather firm, but not violent—a perfectly uniform pressure and with a very steady hand, for several minutes if need be. The patient meantime should be entertained and diverted, the scrotum being held well up by the unemployed hand, which at the same time steadies the beak and the curve of the instrument through the perineum. If under such a manœuvre the sound does not presently slip along and glide smoothly and rather swiftly into the bladder, especially if under cocaine or general anæsthesia, it may be either because the stricture is not spasmodic, or because the beak of the instrument has not been properly brought to bear upon the cramped muscles.

The diagnosis of stricture of small calibre is more easily made than that of stricture of large calibre.

Congenital constriction of the meatus, external or internal, may be readily seen or detected by instruments. The existence of a tight area along the pendulous urethra is discovered without difficulty. Sometimes it may be felt upon the exploring instrument, and often when composed of inodular tissue it may be felt from the outside. It is well to begin with an instrument of medium size and carefully note the depth at which its further entrance is obstructed, and then by carefully going down the scale the correct size of the calibre of the stricture may be determined. In the same manner when several contracted areas exist they can be detected, located, and measured.

In exploring the deeper portion of the canal a blunt, curved steel instrument should be employed, and the size gradually diminished until one which will pass the constricted area is found. Very small steel instruments, unless deftly handled, are dangerous and may cause false

passages in the canal; and therefore if the apparent size of the stricture calls for the use of a very small instrument, it is better to employ gum elastic olivary bougies, which will serve the same purpose and are less dangerous.

When the point of narrowing is contracted sufficiently to oppose the entrance of even the olivary instruments, after the question of spasm has been considered and eliminated, it may be necessary to resort to the filiform bougie; and having engaged one of these small instruments in the mouth of the stricture, it is sometimes possible to gain an entrance with a bougie several sizes larger. Nothing need be added to what has already been said concerning the possibility of confounding spasm of the deep urethra with true organic stricture. If the precaution be taken to commence the urethral examination with a large-sized blunt steel instrument, thoroughly warmed, and to proceed as directed, error is hardly possible. In a doubtful case, if the meatus is very small it may not be possible to use a large enough blunt steel instrument to decide the question of spasm. A surgeon may sometimes declare that no instrument will pass because he has used a fine whalebone to commence with, and having caught this instrument in some follicle, has been unable to reach the bladder; or he may have passed the instrument into the bladder, and finding it is held somewhat by spasmodic contraction on its way out, has decided that there is tight organic stricture equivalent to the size of the instrument. Finally, if no instrument can be passed and the question between spasm and true stricture remains undecided, a general anæsthetic may be administered, when a filiform bougie in the case of tight stricture or a large instrument when urethral spasm exists may be introduced after all attempts without the anæsthetic have failed; and thus a stricture, if present, may be located, its permeability ascertained, and its calibre estimated.

## Treatment.

There is no one method which can be applied to the treatment of *all* strictures.

The general treatment consists in the employment of such remedies as are known to have special value in inflammatory conditions of the genito-urinary tract, while those things which are known to be a sourse of irritation to this region should be discreetly avoided.

The surgical treatment of stricture is of great importance. Various surgical measures have been employed, the principal and most important of which are dilatation, progressive or rapid, urethrotomy, internal and external, divulsion and electrolysis.

It cannot be reasonably stated that all strictures should be treated by any one of the various methods in vogue. Electrolysis has been weighed

by experience and found wanting. We have tested it thoroughly and reject it absolutely.

It is extravagant to state that all strictures should be cut—a doctrine which, although never universally accepted, has been too widely applied of late years by those who looked upon the urethra as a canal with a uniform calibre throughout, and regarded it as necessary to remove by incision any encroachment upon this calibre. It is equally unjust, on the other hand, to say that all strictures should be dilated, for there are decided exceptions to such a rule, and it is as impossible to generalize with respect to this method of treatment as it is in regard to the others. Some strictures are more satisfactorily treated by cutting; many others, and probably the majority, are well adapted to the treatment by dilatation, and should be treated by this method.

The choice between dilatation and cutting should generally be made in favor of the former, but the size of the stricture is not necessarily a guide to the choice of treatment. Some very tight strictures can be easily dilated and are therefore appropriate for this method, whereas some very large strictures, while the dilating instrument can be readily passed, yet, on account of the elasticity and resiliency of the tissues, will recontract so rapidly that anything approaching a cure is impossible unless cutting be resorted to.

To summarize the various methods of treatment as applied to the different forms of stricture, we might lay down the following rules:

1. All soft strictures, whether of the anterior or posterior urethra, should be treated by dilatation.

2. Strictures of a fibrous character, whether of small or large calibre, should be treated by dilatation at first, and when dilatation fails or the stricture is intractable beyond a certain point by this method, urethrotomy should be resorted to.

3. Strictures of large or small calibre which are readily dilatable, but which recontract after a very short interval so as to render it necessary to continue the use of the dilating instrument at frequent and short intervals, should be cut for the purpose of making such intervals of longer duration.

4. Strictures of the anterior urethra which require cutting should be treated by internal urethrotomy.

5. Strictures which occur at the bulbo-membranous junction or behind it, and require cutting, should be treated by external urethrotomy.

6. Strictures of small calibre which on account of their depth and proximity to the posterior urethra are accompanied by severe posterior urethritis and cystitis are sometimes more suitably treated by external urethrotomy on account of the additional benefits derived through the efficient drainage of the bladder and posterior urethra, which is obtained by means of this operation.

7. Strictures of the bulbous and bulbo-membranous urethra which are constructed of fibrous inodular tissue should be treated by external urethrotomy and the mass of inodular tissue excised.

8. Irritable strictures, and those occurring in individuals particularly prone to urethral chills after the employment of instruments in spite of proper antiseptic precautions, may be properly treated by external or internal urethrotomy, according to the depth of the stricture, and sometimes with more satisfactory results than by dilatation.

**Electrolysis.**—Electrolysis is mentioned only to be condemned. Its claims have not been established. It is just now, however, one of the methods in use, and therefore should be described.

Generally speaking, the electrolytic treatment of strictures is employed by two methods—one in which the strength of the current applied is of great, and the other in which it is of feeble intensity. The principle upon which rests the alleged value of the galvano-caustic chemical action lies in the fact that a cicatrix remaining after the application of a caustic alkali is soft and not retractile in character; that when a galvano-cautery is applied to living animal tissue it is found that at the positive pole there exists such a cicatrix as is produced by the application of an acid, while at the negative pole is found one similar to that produced by the action of caustic alkalies. The method of electrolysis, as recommended by Fort, is an example of the employment of the galvano-caustic current of strong intensity, and his instrument resembles somewhat the Maisonneuve urethrotome. The other method of electrolysis, which consists in the application of a current of feeble intensity to the strictured area, constitutes what is known as the Newman method. The instrument employed is a metal olive bougie, of a size as large as can be introduced in the urethra and engaged in the stricture. The galvanic current, which does not exceed three to five milliamperes, is applied for about ten minutes, at the end of which time the bulbous instrument is supposed to pass with greater facility through the strictured area.

It will be seen from a description of the instruments employed in these two methods that one is shaped like a cutting and the other like a dilating instrument; that one is rapid and employs a current sufficient to enable the blade to penetrate the tissues; that the other is mild and gradual and rather aims at distending the constriction. It is therefore more than doubtful whether the addition of the electric current accomplishes any more in these two operative procedures than what is attained by instruments so closely resembling them, minus the addition of electricity, and, in fact, there is a well-founded belief that the electro-chemic action produces a detrimental effect upon the tissues.

**Progressive Dilatation.**—Steel instruments, nickelled, conical in shape, are most serviceable, and do the most accurate as well as the most effective work in dilating the canal, either pendulous or deep, provided

the size of the instrument is as large as No. 10 American (15 French). Should the stricture be smaller than this size, soft instruments are best to commence with.

FIG. 67.—Conical Steel Sound (double taper).

The conical instrument (Fig. 67) tapers for two and three-quarter inches, and should be made upon what is called the short curve, with an extra shortness of the curve at the last half-inch near the beak, since this extra curve greatly facilitates introduction, especially at the hole in the triangular ligament, by keeping the point of the instrument against the roof of the canal. It should also taper in the direction of the handle after maintaining its full size for about two inches. With this instrument the meatus, which is often somewhat contracted, is not kept upon the stretch while the deeper portion of the canal is being distended. Such an instrument, as large as the stricture will admit, lubricated and warmed, should be passed with great gentleness well into the bladder. The power of the instrument is great, being, as it is, a compound of wedge and lever, and the surgeon should exercise sufficient control so as not to do damage to the urethra. The passage of one such instrument as this is equivalent to the passage of from seven to nine sounds of the blunt pattern, since the conicity extends through as many sizes.

The instrument is to be introduced, and then, very gently, immediately withdrawn. If the urethra be irritable at the first sitting, only one sound should be passed—a sound of moderate size.

The time most appropriate for a reintroduction of the steel sound in case of stricture of large calibre must be determined by the effect produced by the instrument upon its trial trip. The immediate effect is often only an increase in the amount of pain experienced during urination.

After a day or two the discharge from the urethra often visibly increases; but this subsides spontaneously or by the aid of a very mild injection, and at the end of four or five days the symptoms for which the sound was introduced have reached the same grade as that at which they

existed at the moment of the first introduction of the sound. Forty-eight hours should be allowed to pass, or even longer, after the first instrument, and then a sound of one or two sizes larger may be introduced, but it is well to precede this by a smaller instrument.

The result of this second instrumentation is that the symptoms are less aggravated by it than they were by the first, improvement arrives a little sooner, is more marked, and remains longer. In this way, increasing the sizes and using on each occasion a conical sound as large as will pass, the symptoms of the stricture generally yield entirely. The most effective treatment by large instrument is that which leaves an interval of one week between the passages of the sound.

After the symptoms have disappeared the treatment should be discontinued gradually. In some mild cases of stricture, not resilient and not traumatic, treatment may be suspended entirely after a few weeks, and the patient is and remains well for an indefinite period, excepting that he is capable of getting a urethritis from a lighter cause than if he had never had previous trouble. If he does not expose himself, however, to the causes of urethritis, he may marry and remain well without ever showing any symptoms of lack of health in his urinary or genital apparatus; but often at the end of a certain period, whether a new provoking cause be added or not, symptoms of irritation arise, indicating recontraction of the strictured area, when the passage of sounds is again called for, the single introduction of which may be sufficient to carry him over another period of similar or longer duration before the evidence of recontraction again recurs. By stringing out and extending the intervals in this manner it is often possible practically to discontinue the use of the sound. This is especially true concerning strictures of large calibre of the pendulous urethra, those for which such splendid results in the way of radical cure are claimed by the advocates of the perpetual use of the knife. Truly, in those cases cured by dilatation, the urethrameter, if screwed up to make the bulb large enough, will detect tight places along the pendulous urethra after cure; but so it would have done when the patient was virgin of all disease, and it has already been shown that tight places in the pendulous urethra, without symptoms, need not be strictures at all.

There is a class of strictures which produce varied symptoms—generally of mild urethritis—which do not yield entirely to dilatation, nor do their symptoms disappear under the use of the steel sound. They are resilient, that is, they have in them that tenacious, elastic, retractile quality which does not allow dilatation to affect them favorably beyond a certain point. The symptoms yield, but do not entirely disappear. A little discharge in the morning continues to mock the efforts of the surgeon and to disgust the patient with his disease. In these cases, after being certain to locate the symptoms accurately in the stricture, and not to be deceived by ascribing gleet due to diathetic or other cause to a

tight spot found in the urethra, the advisability arises of internal urethrotomy within the pendulous urethra if the stricture be located in that region. Under these circumstances, the operation offers a good chance of success in ridding the patient both of the final remains of his symptoms and of the necessity for a continuation in the use of sounds—if the surgeon cuts wide enough at any one point and passes entirely through the unyielding contractile ring of stricture.

The treatment by internal urethrotomy, however, is generally applicable only to the pendulous urethra. All organic strictures at or deeper than the bulbo-membranous junction should, if possible, be treated by dilatation alone—by dilatation to the greatest limit to which it can be carried with gentleness—and this will cure the symptoms, or so nearly cure them that most sensible men who are made familiar with the dangers of internal urethrotomy in the curved portion of the urethra will be satisfied with the result.

Such a cure, or relative cure of stricture in the deep urethra, especially in bad cases of inodular stricture, cannot be maintained excepting at the expense of constant dilatation. The patient is condemned to pass an instrument, at such intervals as may be found necessary (about once a month, and after a time at longer intervals), for the remainder of his life in order to keep down his symptoms and to prevent the recontraction of his stricture. And this is still the case, no matter by what treatment the urethra has been brought to such a size as to allow the passage of a full-sized instrument into the bladder. Repeatedly does the surgeon find, in hospital and dispensary practice, cases of tight stricture in the curved urethra which have already been subjected once, twice, or perhaps three times to internal urethrotomy, or even to external urethrotomy. We have performed perineal section more than once under each of these circumstances, when the patients, from neglect to pass the sound continuously after a former cutting, had allowed the urethra to close at the point of stricture. And we have treated a large number by dilatation after recontraction had followed the cutting operation.

Stricture of large calibre in the pendulous urethra may be treated so that its sympoms may cease forever, without the necessity for any further use of instruments in the canal.

The same is true regarding the treatment of stricture of the deep urethra.

Resilient stricture of large calibre in the *pendulous urethra* is often incurable except by the knife; and internal urethrotomy, if the cut be large enough, will generally cure the symptoms of such a stricture so that they will not return, although no instruments are used in the urethra after the cut is well.

Small organic strictures in the pendulous urethra are probably always best managed by internal urethrotomy.

Strictures of the deep urethra, when organic and situated at or beyond the bulbo-membranous junction, cannot, all of them, *with certainty* be radically cured by any operation or by any treatment. The best treatment in these cases is dilatation when practicable. Sometimes, after dilatation has been maintained for a long period, the tendency to recontraction ceases, and the patient remains well, so far as symptoms are concerned, without the necessity of any further instrumentation in the urethra. Possibly a like cure may occasionally follow internal urethrotomy; but, in the majority of instances of nodular, organic, and traumatic strictures of the deep urethra a cure is not obtained radically by any operation yet known, and the patient's safety consists in a maintenance of the calibre of his urethra by the occasional passage of a full-sized instrument through the obstruction for the rest of his life—a task not considered at all difficult by those who do it.

Strictures of small calibre in the pendulous urethra, when they are fibrous and resistant, should be cut, since they are quite certain in the long run to prove resilient, and require cutting perhaps after much time has been lost in attempts at dilatation. If they prove too narrow to receive the urethrotome, their calibre may be raised in a few days by dilatation, and then, as soon as the urethrotome will pass comfortably, they may be cut.

For all strictures of the deep urethra dilatation should be the rule and all operative measures the exception, for the double reason already stated: 1. An operation may mean unnecessary danger to the patient, and such a risk as his physical condition may not warrant. 2. After cutting internally or externally, and after divulsion, a radical cure is not attained in most instances—only relief as a rule, which is made effective by a continuance of dilatation, at more or less prolonged intervals, for an indefinite period.

Dilatation of stricture of small calibre is done much after the manner advised in the case of stricture of large calibre, with the exception that, when soft instruments are used, the intervals may be considerably shortened. Practically, however, the rule is the same. When the effect of one dilatation is at its height, another larger instrument should be gently introduced and immediately withdrawn. With very fine instruments, one day is a long enough interval to be allowed to pass after the first sitting; then the interval may be raised to two, then to three and four days, with advantage. As soon as size 10 American is reached, soft instruments may be abandoned and the dilatation continued with conical steel sounds, as in the case of stricture of large calibre.

In attempting to dilate a stricture of very small calibre considerable difficulty may sometimes be encountered. After a small size steel sound has been tried in vain, an effort to reach the bladder may be made with

a small, soft, black conical bougie, sharp-pointed, not olivary (Fig. 68). Several small sizes of these may be tried.

If any instrument so far tried passes the stricture, the amount of ease with which it glides through the tight spot should be estimated, the instrument immediately withdrawn, and, unless there be some special reason to the contrary, the patient should be let alone to see what effect will follow the first instrumentation. If urethral fever follows, and especially if the patient has albumin in his urine, all subsequent explorations must be made with special care, and with the proper antiseptic precautions and medical aids for the prevention of chill, which will be mentioned later.

If none of the instruments thus far tried will pass, a very valuable instrument still remains—the filiform whalebone bougie, with the point twisted into spiral, or bent so as to be thrown out of the axis of the shaft of the instrument (Fig. 65, p. 120).

A small syringeful of hot sterilized oil is first thrown into the urethra, and then the surgeon feels the anterior face of the stricture with the

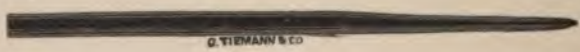


FIG. 68.

twisted end of one of these fine whalebones. By advancing the instrument during rotation, with the urethra made tense by pulling upon the penis, the tip of the filiform bougie is presented at different points upon the face of the stricture, and finally, in a skilled hand, is quite certain to find the orifice of the stricture and to enter it. Once entered, the rigidity of the whalebone comes into play, and the instrument promptly passes on and enters the bladder. It is rare indeed to encounter a stricture into which one of these slender little instruments cannot be made to pass; nearly all the so-called impermeable strictures yield to them. The main difficulty in their employment is the facility with which the point becomes entrapped in the mouths of dilated follicles, or of a false passage, should one exist. This defect may in a measure be overcome by the well-known device of crowding the urethra full of these fine threads of whalebone, and then pushing upon them alternately until the one which presents at the mouth of the stricture passes on into the bladder (Fig. 69). An attempt to widen the mouth of the stricture by distending the urethra in front with air or hydrostatic pressure is an expedient sometimes tried in order to gain an opening wedge, to be the starting-point of further dilatation.

But when, in the case of a very tight stricture, a fine whalebone has been introduced only after long patient trial, and especially if there be actual or impending retention, the surgeon's course should depend in a measure upon the character of the stricture, as well as the patient.

If the stricture be inodular, complicated with perineal fistula; or very hard and of traumatic origin; or attended by perineal abscess; or (above all) by infiltration of urine; or if the patient be hard to manage, having been partly cured before and then allowed himself to relapse; or if he be urgently pressed for time, or subject to repeated and prostrating attacks of urethral fever (his kidneys being presumably sound)—under any of these circumstances perineal section upon a guide is called for, and should be performed at once or within twenty-four

FIG. 69.—Method of Finding the Opening of a Tight Stricture with Filiform Bougies.

hours. The filiform guide may be tied in the urethra and left there until the operation, if there has been great difficulty in procuring an entrance.

If the case be not urgent on any of the above grounds, while it has been quite difficult to pass the stricture with the filiform bougie, the mild and very efficient expedient of continuous dilatation may be used.

**Continuous dilatation** is the action exerted upon a stricture by the constant presence of an instrument passed through it. The whalebone or small gum elastic bougie, once inserted, is simply to be retained in place by a piece of heavy silk tied tightly around it near the meatus. The two ends of the silk are then tied together so that the knot shall lie upon the frenum just at the curve of the corona glandis, and then the separate ends are carried around on either side under the corona, and tied with moder-

ate tightness upon the dorsum. The distal end of the bougie should reach the neck of the bladder, or rest just beyond it (Fig. 70).

In this condition the patient is sent home and told to keep quietly about the house. In twenty-four hours the whalebone may be removed and one several sizes larger introduced with ease. This is in its turn

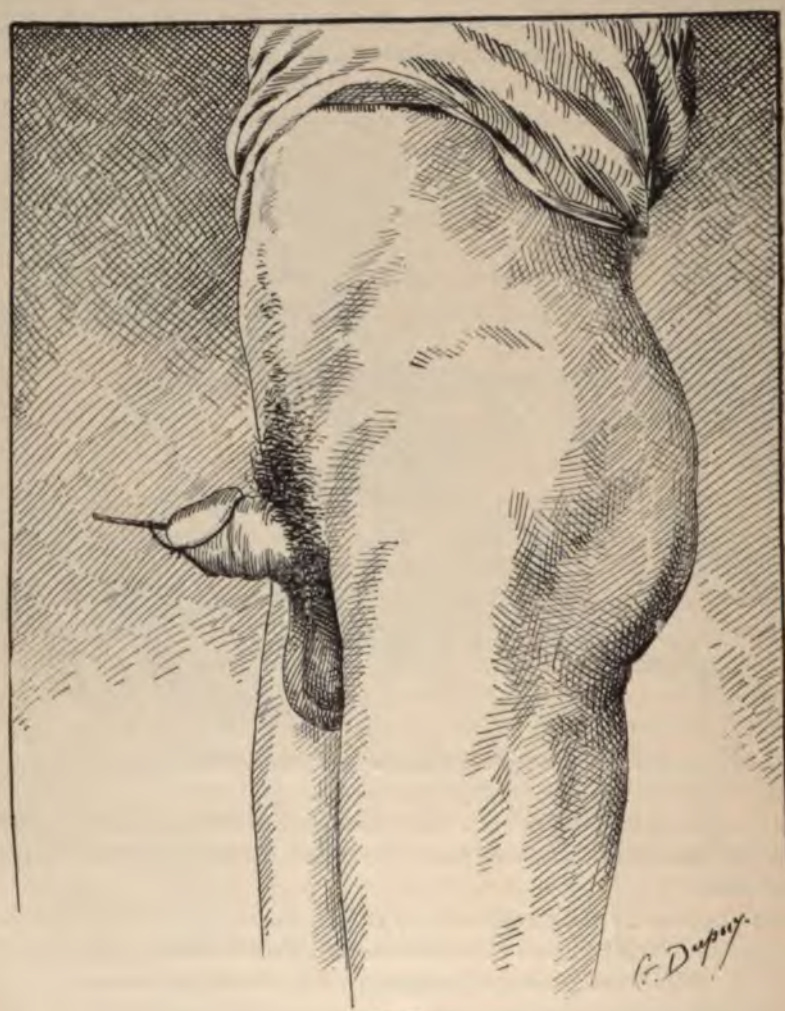


FIG. 70.

tied in. The patient urinates easily alongside of the instrument; sometimes there is incontinence. The continuous pressure causes, first, muscular action, spasm, and the bougie is grasped, then relaxation of spasm, then inflammatory swelling, then absorption, and usually suppuration. The second instrument may be left in two days or more. In this way, in

a week most strictures (if commenced with very small) may be raised a number of sizes. In replacing a new bougie, generally an increase of two or three sizes is possible, but it should glide in easily without pressure. It is well during the retention of the bougie to keep the anterior canal

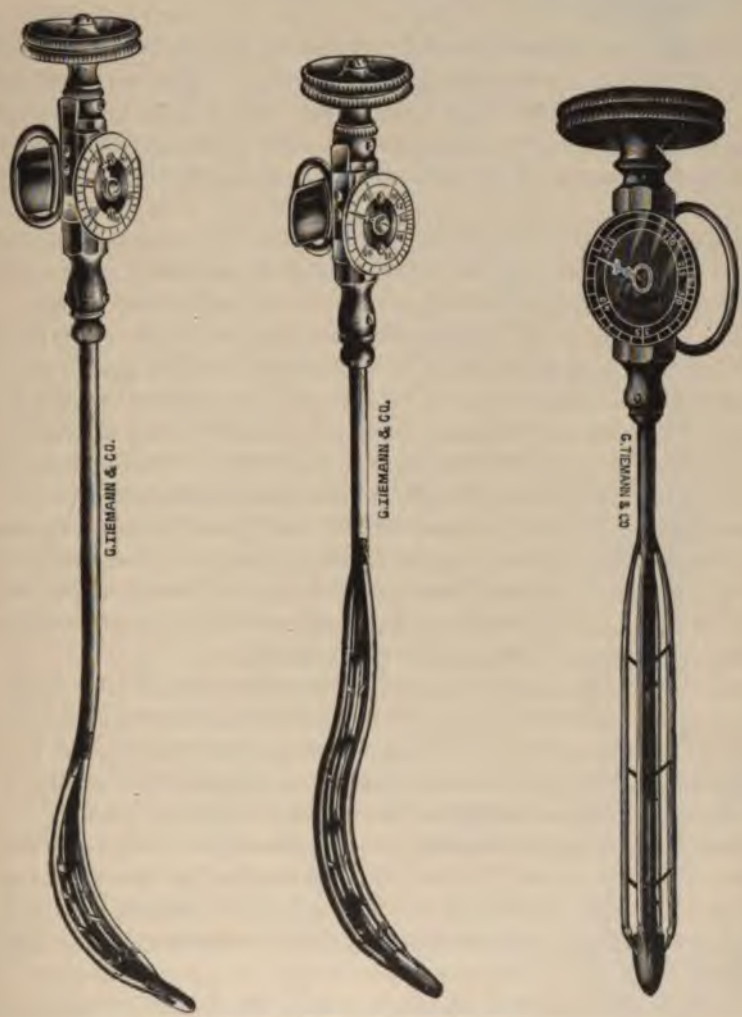


FIG. 71.—Kollman Urethral Dilators.

flushed out with an antiseptic solution (boric acid three per cent, or permanganate of potassium 1 : 4,000). The larger the calibre of the stricture, the less promptly, as a rule, does continuous dilatation affect it. After the stricture has reached a reasonable size, treatment by ordinary dilatation may be commenced; but the intervals must be rather short at

first, since a stricture promptly raised to a large size by this method very promptly falls back again if let alone.

There are some cases of tight stricture in which one may be content with simply passing a filiform instrument and not tying it in, trusting that on the following day a larger size may enter, as in ordinary treatment by dilatation.

Finally, there are cases not quite desperate enough to justify external urethrotomy, not able to give the time to ordinary dilatation (although it does not call for a day in the house, much less in bed), and yet urgent enough to justify prompt measures which shall afford speedy relief. For this class of cases two operations remain—internal urethrotomy or divulsion (see p. 142).

**Rapid Dilatation.**—This method differs from the previous ones in that it aims at re-establishing the normal calibre of the canal at one sitting. In other words, instead of being progressive, gradual, and slow, it uses force. A number of instruments fashioned on the same principle have been invented for the application of this method, notably by Tuttle, Oberländer, and Kollman (Fig. 71). These instruments are capable of exerting a great deal of force, and permit the distention of the canal very much beyond its normal calibre, as high as 45 on the French scale. This method, which is somewhat rough and exercises its extreme distention on a large portion of the urethra not included in the stricture, is something of a compromise measure between the mild and slower means of progressive dilatation and the rapid immediate means of "divulsion" (to be referred to later), and has nothing in its favor to place it before either of these two procedures in the choice of treatment.

**Internal Urethrotomy.**—Stricture far forward in the urethra or contracted meatus should be cut. This is most conveniently done with a straight, blunt bistoury. The prepuce should be retracted, the head of the penis seized between the thumb and index finger of the left hand, and the blade of the knife introduced to the proper depth in the urethra. It is generally best—often necessary on account of the pocket—to cut the meatus along the floor of the urethra; but in some peculiar shapes of the glans penis it may be better to cut the roof of the urethra. This operation may be rendered absolutely painless by the employment of cocaine or eucaine.

A convenient method of procedure is to have on hand a half-grain tablet triturate of either of these drugs, which is to be placed just inside the meatus; it becomes softened by the normal moisture of the canal, and is left in contact long enough for absorption to occur.

When all is ready the surgeon squeezes the glans penis with the thumb and finger which hold it, and at the same moment slowly and steadily draws the sharp blade along the floor of the urethra, appreciating with his surgical sense of touch the resistance offered to the knife by the

encircling band of stricture. When this yields and is thoroughly cut through, he can appreciate it at once by a cessation of the feeling of resistance which the band has given, and he has cut enough. If it is only a pouched meatus which the surgeon has to transform into a slit, he regulates his incision accordingly. Civiale's or any other meatotome may be used, if the surgeon prefers. The operator may place the index finger of his left hand along the integument beneath the urethra, so that the stricture band may be felt between the finger and the knife. In this position he cuts directly upon the finger until he can feel the point of the knife against the soft tissues and appreciate the absence of the band between the finger and the knife. The band of constriction behind a tight meatus is readily detected with a bulbous instrument; hence the bulbous urethrotome (Fig. 72), a modification of Civiale's, is useful in incising it at the point of resistance. The meatus is often cut improperly. The fault lies in either cutting too much or too little. Many cases are seen in which an unsightly and unnecessary deformity is produced by the operation of meatotomy, amounting in some instances almost to a balanic hypospadias, the result of which is to scatter the urinary stream as it passes the meatus, thereby causing much annoyance. On the other hand, the meatus is insufficiently cut when the external fissure only is enlarged. Such a case has the outward appearance of an ample-sized meatus, but by an attempt to introduce a bulbous bougie it is discovered to be surprisingly small. The interior constricting band has been left untouched, and should be cut with a bistoury or bulbous urethrotome, always upon the floor.

FIG. 72. — Chetwood's Urethrotome; a modification of Civiale's.

The cut meatus sometimes bleeds profusely, sometimes hardly at all. The expedients for stopping the blood consist in applying pressure for a time, by the application of a strip of rubber plaster around the extremity of the penis, or by a snugly applied narrow finger bandage, with or without the addition of a small flat splint. In cases of moderate bleeding the application of several coats of collodion to the well-dried meatus, while it is held under pressure to prevent the oozing until the collodion has set, may answer the purpose. There is no danger from excess of bleeding, for the patient can stop the hemorrhage until the surgeon

arrives by digital compression, and the surgeon can always finally arrest it by properly applied pressure, as described above.

It is better not to put subsulphate of iron into the urethra, since this substance is likely to leave the walls of the canal inflamed, hardened, and ready to suppurate. Much time in the treatment may be lost on account of the use of this hæmostatic.

When there is little or no bleeding, some cotton or lint, so arranged as to be retained beneath the prepuce, is all that is required. Often when cocaine is used no bleeding occurs at the time, on account of its contracting effect upon the small vessels; and soon after this effect has worn off the bleeding becomes quite free.

It is always wise to caution the patient to apply a snug bandage before retiring for the first one or two nights, as when erection occurs during sleep it may bring on free hemorrhage from the freshly cut surfaces of the wound.

A cut orifice will heal up immediately if left to itself. This is prevented by having the patient return in two, four, eight, and twelve days

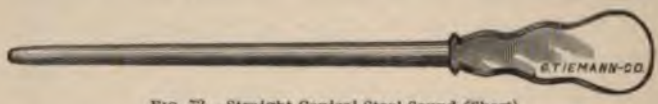


FIG. 73.—Straight Conical Steel Sound (Short).

to allow the surgeon to pass a straight steel instrument (Fig. 73) through the meatus, to keep the wound open until its surfaces are covered with epithelium.

The meatus sometimes bleeds more freely when the instrument is passed for the first time than when it was cut, and should be controlled in the same manner. Another plan to prevent closure of the wound is to furnish the patient with a hairpin, with the curved portion rebent and the angle much increased in size, so as to be large enough when oiled, and passed down the urethra, to lie with one leg of the pin against the roof of the urethra, the other leg at the bottom of the whole length of the wound, while the two points are outside. The patient is told to pass this on the night after being cut, and on the following two nights; then to skip a night for two passages of the hairpin; then to skip two nights for three passages. By the end of this time (a full fortnight) the meatus has often healed entirely, or so nearly that it may be left to itself, and, if thoroughly cut and healed open, it never recontracts.

When internal urethrotomy has become necessary in the treatment of a stricture of the pendulous urethra more distant from the meatus, one of the various special instruments devised for this operation is used.

The urethra is previously washed out with a mild boric-acid or saline solution, and about two drachms of a four-per-cent solution of cocaine or eucaine are injected and retained about ten minutes.

The urethrotome of Civiale represents a type from which several modifications have been constructed (Fig. 72); the principle of this instrument is shown in the accompanying figure (Fig. 74). The bulbous

FIG. 74.—Civiale's Urethrotome.

extremity is passed beyond the grasp of the stricture, and the concealed blade is unsheathed while the instrument is withdrawn so as to cut the stricture from behind forward. This instrument or any of its modifications are applicable to strictures of a calibre not smaller than 16 or 17 French, and when it is desired to incise bands or contracted areas to a limited extent, and proceed thereafter with dilatation.

It must be stated that cutting a stricture with any instrument does not produce a radical cure, nor allow the patient necessarily to dispense with a continual use of the sound, although such a result may be obtained and it should always render it possible to extend greatly the intervals between the passages of the sounds.

Otis' dilating urethrotome is simple and strong. It is a modification of a number of previous types, so combined as to form an instrument which performs its functions very accurately. It consists (Fig. 75) of a shaft, the blades of which may be separated by a screw movement in the handle, and a small knife, which fits in a groove of one of the arms of the dilating portion and which, concealed near the distal end, is exposed and brought into action when its handle at the proximal end of the instrument is drawn out. A dial plate in the handle registers the degree of separation of the blades.

FIG. 75.—Otis' Dilating Urethrotome.

In using this instrument, the location and extent of the stricture to be cut are at first definitely decided upon, with the urethrameter or bulbous sound. Then the urethrotome is introduced (dial plate and knife toward the roof of the urethra) so deeply that the point at which the knife blade shall emerge shall be at least three-quarters of an inch deeper in the urethra than the deepest limit of the stricture. This is necessary in all strictures of large calibre; without it the deepest parts of the stricture—those most distant from the meatus—are not cut. For the lower blade of the instrument, in open-

ing, pushes away the urethra, making it slide back from the upper blade; so that, no matter how accurately the meatus may be held against the shaft of the urethrotome, the position of the knife relatively to the stricture slides forward proportionately to the amount of separation of the blades, and therefore, when the knife is brought into action, it may commence the cut entirely in front of the deepest (often the tightest) portion of the stricture, unless special care is taken to avoid this mistake.

When the instrument has been properly placed, the blades are separated until they mark the size to which it is desired to cut the stricture. In cutting, the handle of the knife is withdrawn far enough to make the cut in all at least half an inch longer than it was originally decided that the stricture measured. Now the blades are to be rapidly approximated, and the knife is returned to its concealment before withdrawing the instrument. If several points of constriction exist in the course of a single strictured area, they may all be included in a single incision along the roof. If multiple stricture exists and a considerable interval of healthy urethra separates them, they may be cut at the same sitting, but by different operations, the deeper one being cut first. The flow of blood forms no material impediment to cutting the second stricture. If the meatus is to be cut, it should be cut along the floor as the first step in the operation, if this has not already been attended to in the preliminary examination. No ether is necessary in the performance of this operation. Cocaine or eucaine may be used, the danger of cocaine being always borne in mind. It should be done slowly, for accuracy and precision are essential factors of success.

After the cutting has been accomplished, it is well to pass a bulbous or straight steel sound over the cut region, to decide whether the cutting has been efficient and has thoroughly relieved the constriction.

If this is found not to be the case, the urethrotome should not be reintroduced. The second cut is likely to pass through the stricture at a different point, and a third cut to take still another route. Thus the stricture becomes partly cut in a number of places, its outermost circle not being cut through anywhere; and more cutting is done than is justified by the end in view, since each cut increases the possibility of cicatricial changes. The way to avoid the necessity for a second cut is to make the first one deliberately, to locate it accurately, and to make it deep enough. If this is not done, it is wiser not to perform a second operation until it is determined that dilatation will not accomplish the desired result, and not until it has been practised for a sufficient period after the first cut has healed, and then to start afresh, as if nothing had been done previously.

It remains to determine how deeply to cut a given stricture of large calibre in the pendulous urethra. This cannot be absolutely decided by any criterion. Dr. Otis, as already stated, has fortified his followers with

a scale, based upon an alleged constancy of relation between the normal size of the urethra and that of the penis in repose; yet this scale (which is certainly only approximate) does not give its followers the satisfaction of doing the whole operation at a single cut. In many operations the urethrotome is introduced twice or more often at the same sitting; and very frequently it is found, after some days or weeks, that the stricture has to be cut over again. When this method was first taught it was not uncommon to see cases in which there had been repetitions in the cutting, to the extent of four times at different sittings, and in the same individual, and that too without resulting in a cure. Consequently it is rather idle to attempt accuracy by measuring so uncertain an organ as the penis, even if the scale possessed the accuracy which its inventor ascribes to it; and the question remains: What rule, if any, have we to go by?

In answer, it may be stated as a general proposition that the strictured point which will not yield to dilatation must be cut so as to be somewhat larger than the normal urethra at that point; and that, to insure the best results, a single cut should be made—a cut, if possible, to pass beyond all diseased tissues and into the healthy tissue.

This result is probably often attained by following the measurements of Dr. Otis, since his estimation of the size of the urethra is extreme; but even his measurements will not suffice in some cases in which inodular tissue has involved the whole substance of the corpus spongiosum, while often they are unnecessarily high.

A fair rule to go by is first to establish the fullest size to which the normal meatus may be distended—the normal meatus not strictured and without pockets—and to cut the stricture, after having screwed up the urethrotome to mark not less than two sizes (American, three or four sizes French) higher than that limit. Should the meatus be strictured congenitally or by disease, the surgeon's judgment must guide him in the extent of his incision, both of the meatus and of the deeper-seated stricture, remembering that the normal meatus of the full average-sized penis in the American will range very close upon 20 American scale (30 French). In other words, a conical steel instrument of size 20 will pass, by its own weight, the normal meatus (without pockets) in the average American male taken at random, with fair-sized genitals, or certainly may be passed with a little coaxing, putting the meatus more or less on the stretch, without in the least tearing or injuring it. A penis of less size will have a more moderate urethra, as a rule.

It has been found by experience, as Dr. Otis has shown, that the breadth of the knife blade does not count, and that if the blades of the urethrotome be separated to 20 and the cut then made, the strictured point will be found to be cut not above size 20. Therefore, the limits of cutting which are given are quite moderate, for the meatus is normally the smallest part of the canal, and an incision at least two sizes larger, lower

down, is not extravagant, since the cut is quite certain to lose one size while healing.

If, after healing, it is found that the symptoms persist, and the resiliency of the stricture remaining shows that the outside fibres have not been cut through, then another operation may be performed, the surgeon being fortified by the knowledge gained during the first operation, and the cut on the second occasion may be made two or even three (American) sizes larger than before; but dilatation with increasing intervals should always be tried before recourse is had to a second cutting.

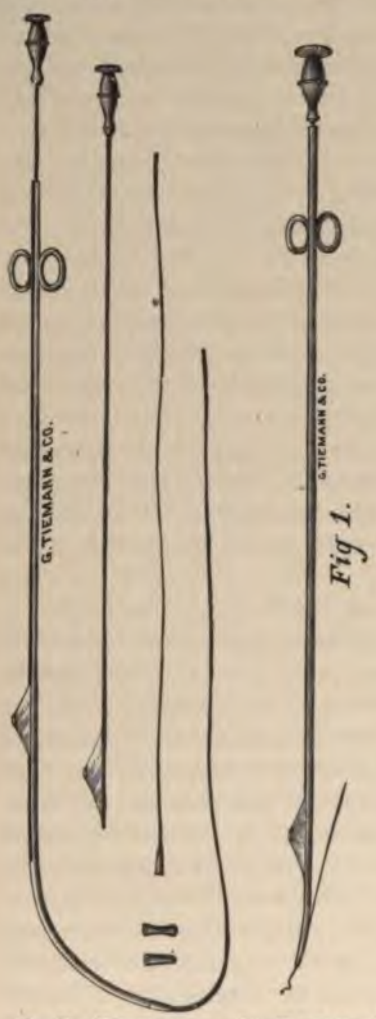


FIG. 76.—Maisonneuve Urethrotome. FIG. 77.—Fluhrer's Urethrotome.

When the calibre of a stricture in the pendulous urethra is too small to admit the Otis urethrotome, an effort should be made to dilate the narrow point sufficiently to receive the instrument. This may be done either by the aid of a whalebone guide and tunnelled sound or by a preliminary partial urethrotomy performed with a slender instrument constructed on the Maisonneuve principle, to cut from before backward. The Maisonneuve instrument consists of a curved conductor, upon which is screwed a fine flexible bougie as a guide. A small triangular blade on a wire staff slides in the groove of the conductor and cuts the stricture from before backward. The apex of the blade is protected by a blunt shield so that the healthy part of the canal is distended, as the knife is thrust along the curve toward the stricture, while the latter is cut by the free edge of the knife. This instrument, which is curved, is adapted for internal urethrotomy beyond the bulbous portion of the urethra. A better instrument for the pendulous urethra is a modification of the Maisonneuve, known as Fluhrer's (Fig. 77). This consists of a grooved conductor, nine and a half inches long, 12 French calibre, slightly curved at its distal

end. A triangular blade on the end of a stylet, similar to that of the Maisonneuve instrument, slides through the groove of the conductor, being protected at its apex by a small blunt shield. This instrument will incise the urethra up to 18 to 24 French. All strictures of the anterior canal except when in close proximity to the meatus should be cut upon the roof, and therefore the grooved surface which conducts the cutting blade of any of the instruments described should be turned toward the roof of the urethra when the stricture is in the pendulous urethra.

Internal urethrotomy beyond the pendulous urethra is an operation which has its adherents, but for several reasons its adoption is not advised. In the first place, the bleeding is likely to be troublesome and much harder to arrest than hemorrhage from the pendulous urethra. There is certainly much greater danger of septic infection when the urethra is incised beyond the cut-off muscle. In fact, many deaths due to this operation have been recorded, and undoubtedly many have occurred which have never been heard from. Furthermore, experience goes to show that when a urethra is incised in the deeper region by means of external urethrotomy, and proper drainage is afforded through the external wound, such serious complications as have frequently been known to follow the operation of deep internal urethrotomy are seldom observed. The additional advantages afforded by external urethrotomy in permitting a close inspection of the strictured portion, the opportunity to incise it upon the floor as well as upon the roof, without going too far beyond the limits of the stricture, and of permitting the complete excision of inodular tissue where it exists, not to mention the benefits derived by the bladder and posterior urethra from the free drainage this operation affords, are all of obvious importance.

The bleeding after internal urethrotomy is very variable. A deep incision in one patient may be attended by a moderate flow of blood, while a slight cut in another will bring on profuse hemorrhage. In a given patient, however, the amount of hemorrhage is proportionate to the number and depth of the cuts. Generally, pressure will arrest the bleeding. It is best applied with the fingers placed directly over the urethra. The blood should be allowed to clot, and the clot that forms and protrudes from the meatus should be left in place and not be removed with the fingers, for this allows only a continuance of the hemorrhage and necessitates the formation of another clot. If the flow of blood persists, continuous pressure from without may be tried by applying a tight bandage around the penis, or by binding two small rectangular splints, one along the urethra and the other along the dorsum, by means of a strip of adhesive plaster and then a narrow bandage. This dressing may be removed prior to urination and reapplied directly afterward until no further bleeding occurs. In some cases little or no blood escapes at the moment of operation, but later, at the time of the next urination or during erection at

night, hemorrhage occurs which may become quite profuse. The same means will suffice to arrest it as described above.

The after-treatment consists in the use of the conical steel sound at appropriate intervals. Until the cut surfaces of the urethra shall have healed over, or before the expiration of about two weeks, the posterior canal should not be entered by the sound. A long straight steel sound is well adapted for use during this period (Fig. 78). Forty-eight hours after the cutting, a full-sized sound—large enough to put the meatus fully

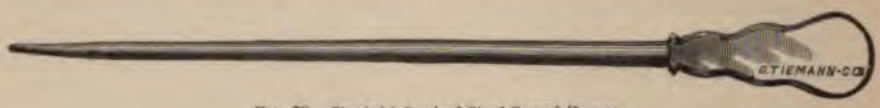


FIG. 78.—Straight Conical Steel Sound (Long).

upon the stretch—may be gently introduced. This is followed by hemorrhage, sometimes more profuse than that which occurred at the moment of the operation; but it yields more promptly, as a rule, and generally becomes arrested spontaneously after a few moments. It is well, however, to exercise the precaution of tying the penis up at night-time in a snug bandage, to prevent hemorrhage during sleep on account of erection. After another interval of forty-eight hours, the same full-sized sound may be introduced; or, if the urethra be generally inflamed so that the large size causes much pain, one size lower may be employed. Again, in seventy-two hours the process is repeated. The next interval may be four days, and the next six. After this one or two passages of the sound, at intervals of one week, often terminate the case, although in many instances a much longer time is necessary, and sometimes one, two, or even more sizes in the sound are temporarily lost, owing to inflammatory conditions in the urethra excited by the mechanical violence to which it has been subjected; but this may be regained by progressive dilatation at longer intervals when the irritation has subsided. The cut is known to be healed when a full-sized instrument can be passed without being followed by any blood; but even after this it is wise to keep up the use of a full-sized sound, at longer intervals, for some time.

If now the symptoms have disappeared, the sound may be laid aside, and the patient is and remains well, although manipulation with the urethrameter may still detect that the point cut is smaller than other parts of the urethra. If the symptoms recur and the stricture recontracts, dilatation should be practised and account taken whether or not the symptoms yield, in which case recontraction may be forestalled by noting the interval after which the symptoms reappeared, and directing that the instrument be used again at about the same interval, or when there exists any tendency to recurring symptoms.

It should be borne in mind that sometimes the symptoms which persist after a stricture has been cut and the attendant irritation has had time to

subside may be due to inflammation deeper in the canal—posterior-urethritis—which necessarily is not relieved by the cutting of the stricture and will require appropriate treatment later on. The patient should be apprised of this fact so that he may be saved a keen disappointment in case he has counted upon an absolute cessation of all symptoms, notably the discharge.

The complications attending this operation besides hemorrhage, which can always be arrested in the pendulous urethra, are those inherent to most operations upon the canal, and due often as much to the after-treatment by instruments as to the cutting operation. They are urethral fever, epididymitis, cystitis, possibly prostatic or peri-urethral abscess, occasionally acute uræmia, and pyelo-nephritis. None of these complications is likely to occur when strict cleanliness has been observed, and when the posterior urethra has not been invaded until the cut in the anterior portion is healed. Another complication, not very uncommon when the cut has been deep, is the formation of new inodular tissue in the corpus spongiosum, causing painful erection and chordee. Painful erections often persist for a long period and curvature of the penis may remain, but not as a rule unless the cut has been too deep.

All these complications call for treatment when they arise, and many of them demand a cessation in the employment of instruments. Thus, the cut is allowed partially to close, but by dilatation later on sufficient distention may often be obtained, and a second cutting operation is not necessarily required. The proper means to adopt to avoid complications after urethrotomy is to keep the patient quiet upon his back for several days after he has been cut, giving him plenty of bland diluents to drink and enough bromide or anodyne, if need be, to keep down erections. Laxatives may be required while the patient is in bed. Alkalines and oil of sandal wood, as administered in simple urethritis, may be of service, and sometimes a mild antiseptic or astringent injection, to keep the canal clean and remove the discharge, may be given if needed several days after the operation, after the patient has been permitted to be about again.

**Divulsion.**—This operation is not at the present day held in favor by most surgeons to such an extent as internal urethrotomy, and the authors have practically discarded it, because it is rough and unsurgical. It has the advantage over internal urethrotomy, however, of calling for less after-treatment by instruments in the urethra, the hemorrhage is much lighter, and the effect often lasting. The danger is certainly no greater in this operation than in internal urethrotomy of the deep urethra. Bigelow's instrument is recommended in soft and yielding strictures. It consists of a shaft with an expanded extremity conical in shape, grooved on one side to fit over a slender metallic guide, attached to a flexible bougie. When the latter is in place, the divulsor is wedged by force through the

stricture, and prevented from going too far by a shield on the end of the guide.

Thompson's tunnelled divulsor, capable of being screwed up to size 21 American scale, is used in tight strictures of the curved urethra. Fig. 79, *a*, represents the instrument. By turning the handle the blades may be separated, *b*, the amount of separation being registered upon an index in the handle. The instrument is to be used as follows:

The depth of the front face of the stricture from the meatus is at first accurately ascertained. Then a filiform whalebone bougie, twenty inches

FIG. 79.

long, must be passed through the stricture until its distal extremity reaches the meatus, the other end lying coiled up in the bladder beyond the stricture. The urethra having been thoroughly washed with warm boric-acid solution and anæsthetized with a four-per-cent solution of cocaine or eucaine, retained five to ten minutes, the divulsor is well lubricated, the tunnel is threaded over the whalebone guide, and, while the tip of the guide and the end of the penis are held tense with one hand, with the other the divulsor is slowly to be pushed along over the guide through the stricture and into the bladder until its point of greatest dilatability lies at the centre of the stricture. The outside of the divulsor is marked in inches to facilitate this step in the operation.

It is necessary to take every precaution, in guiding the divulsor into the bladder, not to let it double up the guide in front of itself. To guard against this, during the whole time that the point of the divulsor is travelling the curved part of the urethra the guide should be pulled upon very gently, so that, as the divulsor slips in, the guide is being steadily pulled out. If too much of the guide is used in this way at any time, the divulsor being left in place, the guide may be again pushed forward through the stricture and the tunnel until all its excess is again coiled up in the bladder, and then, by coaxing and gentle manipulation of the divulsor while the guide is being again withdrawn, the steel instrument is carried safely into the bladder, guided by the whalebone.

When the divulsor is in place, the guide should be entirely withdrawn and the process of divulsion immediately commenced. The handle of the divulsor may be turned slowly or rapidly until such a grade of dilatation has been reached as shall have been previously determined upon, or until blood

begins to flow rather freely from the meatus, indicating that the morbid tissue has been divulsed—torn through. The stricture tissue is brittle, and although tough it tears more easily than the sound tissue, the elasticity of which allows it to escape any considerable injury. Thus, the process of divulsion effects about the same result as internal urethrotomy, with the difference that the torn tissue bleeds less than a similar wound made with the knife would, and has very little tendency to heal up immediately; both of which results are very desirable, since they do away with the necessity for a considerable amount of after-treatment which might otherwise be required.

As the divulsor is being unscrewed preparatory to its removal, its handle should be gradually depressed between the thighs, and its point pushed forward into the bladder until the blades meet, when they may be safely withdrawn. Without the exercise of this precaution, it sometimes happens that the closing blades catch a portion of mucous membrane—either the ragged, torn edge of the stricture, or a fold of membrane lower down the urethra, and pinch it so tightly that the instrument cannot be disengaged by again screwing it up. The little piece of mucous membrane in such a case must, of necessity, be torn away before the instrument can be extricated.

After the divulsor has been withdrawn the bleeding invariably stops promptly, and no other instrument should be passed into the urethra. The patient is simply put to bed and told to remain there from twenty-four to thirty-six hours, after which he may get up and go about his business. If he has a chill, he must be kept longer in bed, and his temperature watched to see whether the chill signifies anything more than ordinary urethral fever.

The question of urethral fever, and its treatment after operations upon the urethra, will be discussed presently.

After divulsion no instrument should be passed into the urethra until the lapse of from five to eight days. The torn tissues do not tend to unite as a cut does, otherwise the after-treatment is about the same as after internal urethrotomy.

The possible complications following divulsion are the same as those liable to be encountered after urethrotomy. Hemorrhage, however, does not occur to any extent.

**External Perineal Urethrotomy.**—This operation is imperatively called for by tight organic stricture deeply situated in the urethra, under certain circumstances, such as infiltration of urine, perineal abscess, numerous fistulæ, and when the stricture is impermeable to an instrument passed from the meatus.

The latter contingency alone does not necessarily demand external urethrotomy. It is also possible in such a case to aspirate the bladder with a fine, perforated needle above the symphysis pubis, once or twice

if need be, and then to try the urethra again with a whalebone guide. Some traumatic strictures also of the deep urethra are excessively tough and resilient, so that they will not yield to attempts at dilatation. These must be cut, and a much more satisfactory result may be obtained and a much safer procedure adopted by resorting to an external than to an internal section. Such a complication of stricture as stone in the bladder naturally calls for perineal section, since two maladies may thus be overcome by a single operation.

**Perineal Section with a Guide.**—This operation is a simple one, much more so than the operation without a guide. Therefore no effort should be spared that may be necessary to effect the passage of a tight stricture with a filiform bougie and a guide introduced, whereby the operation is much facilitated and shortened.

If the stricture cannot be penetrated and a guide introduced before etherization, success may be attained when the parts are relaxed and the patient is unconscious. The preparation of the patient is the same as for any operation in this vicinity. The parts should be thoroughly cleansed and shaved, the bowels emptied by a laxative, and the rectum washed out with saline enemata.

The guide having been passed, the patient is bound in the lithotomy position. The instruments required besides the common accompaniments of all operations, including artery forceps, scalpels, etc., are a straight narrow bistoury, a probe-pointed narrow bistoury or Blizzard knife (Fig. 80), different sizes of tunnelled sounds or catheters (Figs. 81, 82), filiform bougies, probed grooved director, female catheter, and perineal drainage tube (Fig. 83).

In strictures of large calibre, when the operation is to be performed for drainage or whenever the stricture will admit the passage of a staff or grooved sound of any size, by using the largest size possible the opera-

FIG. 80.—Probe-Pointed Bistoury or Blizzard Knife.

tion is rendered so much the more easy. If a filiform bougie has been used to introduce the tunnelled guide, it should be removed provided the latter has passed through the stricture and reached the bladder, which is demonstrated positively, when a tunnelled catheter (Fig. 82) is used, by withdrawing the stylet and obtaining a flow of urine. If this be successfully accomplished the bladder should be emptied and washed with a three-per-cent boric or boro-salicylic solution, a few ounces of which is allowed to remain in the bladder.

While the staff is pressed toward the perineum by an assistant, who

also holds up the scrotum, an incision about two inches long is made in the median raphé, ending one inch in front of the anus and extending through the skin and fascia. The index finger is introduced into the wound to locate the groove on the staff; a sharp-pointed bistoury is then used to incise the tissues overlying the instrument, and by making a clean slit in the urethra its point will enter the groove. The probe-pointed bistoury is now substituted for the sharp-pointed instrument, but the latter should not be removed until the former finds the opening in the urethra and the groove on the guide. The probe-pointed bistoury is now pushed along with the staff toward the apex of the prostate and then withdrawn. A small female catheter is passed through the wound to the staff, which is then withdrawn and the catheter thrust toward the bladder until fluid is obtained to denote that the right path has been taken. A small grooved director replaces the catheter upon which the urethra may be further incised upon the floor and upon the roof, according to the nature and extent of the stricture. If there also exists stricture of the pendulous urethra it should be cut with the urethrotome. The operation is then completed by the introduction of a perineal drainage tube (Fig. 83).

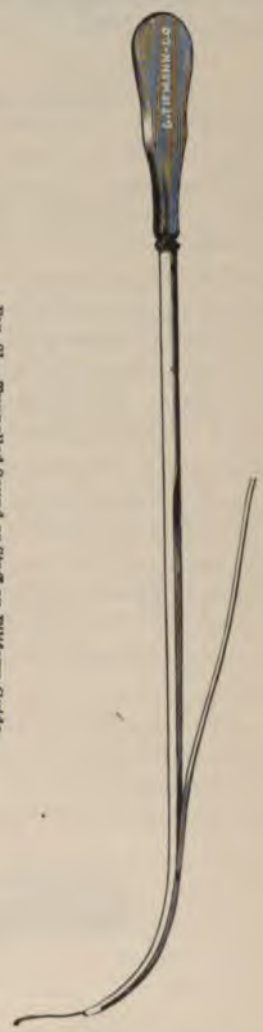

Fig. 81.—Tunnelled Sound or Staff on Filiform Guide.

In those cases in which the obstruction is too tight or too tortuous to permit the passage of a tunnelled catheter or staff through the stricture, the operator passes the tunnel of the catheter or sound over a whalebone bougie, which has been previously introduced as a guide through the obstruction, and carries it down to the face of the stricture. He then, with the scrotum and testicles drawn well up out of the way, entrusts the instrument to his assistant, and proceeds to cut down methodically in the middle line layer after layer, aiming for the tip of the sound, which of course represents the anterior face of the stricture. As soon as the tip of the sound has been exposed, a curved needle, threaded with silk, is deeply inserted on either side through the skin and deep tissues, and brought out through the urethral mucous membrane, just in front of the

anterior face of the stricture, near the tip of the sound. The needle being removed, each ligature is knotted to itself, so as to form a loop on either side. The loops are entrusted to two assistants. They form the best possible means of keeping the wound open without the use of fingers

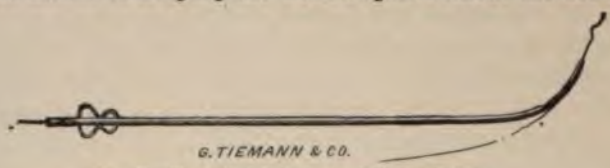


FIG. 82.—Tunnelled Catheter on Filiform Guide.

or instruments, which obstruct the light and allow the whole bottom of the deep wound to be freely inspected, showing the end of the filiform guide disappearing through the stricture among the tissues which have stopped the tip of the tunnelled instrument.

It now requires a little delicate dissection in the middle line, following the black filiform guide, and the obstruction is cut on the end of the steel instrument. Care is necessary not to cut off the slender whalebone in the wound. The tunnelled catheter may now be easily slid forward into the bladder, and the removal of its stylet allowing the urine to flow freely through it demonstrates the success of the operation.

The catheter should now be withdrawn and the site of the stricture examined. If this has involved the roof as well as the floor of the urethra, a bridge across the roof, generally with a slight pocket above and in front, will be noticed. This should be thoroughly cut through, or it may prove an obstacle to the introduction of sounds while the wound is healing.

Bleeding points next require attention, and finally the bladder should be thoroughly examined for stone, and the finger should assure the operator that all the hard, cicatricial tissue constituting the stricture has been thoroughly cut through at each end of the wound. Inodular tissue

FIG. 83.—Perineal Drainage Tube.

should be dissected away and excised. The divided ends of the urethra may be then brought together by sutures, or when a large area has been removed the transplantation of mucous membrane may be attempted. This operative measure has been conducted with success by a few surgeons.[1] The pendulous urethra should also be examined for stricture, which should be cut if found, which will enable the surgeon to convince

[1] Keyes: Jour. Cut. and Gen.-Urin. Diseases, 1891.

himself that he can easily pass a full-sized conical steel sound into the bladder through the meatus.

A perineal drainage tube is introduced so that the eye of the instrument is just within the bladder, and through it the bladder is irrigated thoroughly with hot boric-acid solution; or in the case of marked cystitis a solution of silver nitrate, 1 : 4,000. The tube is held in place by tapes tied to the waistband.

The amount of bleeding is not generally considerable unless the bulb has been slit during the operation, when it is controlled by packing with absorbent gauze beneath the skin in front of the tube. A small packing may also be placed around the tube if the hemorrhage is such as to call for it. This may be removed in forty-eight hours and replaced again if need be.

Irrigation twice daily with boric-acid solution is desirable, and occasionally with silver-nitrate solution (1 : 4,000) if the condition of the bladder calls for it. At the end of two or three days the tube should be temporarily removed and a sound, one or two sizes smaller than the full size, should be passed, after which the bladder should be washed and the tube replaced.

After an interval of another forty-eight hours the same sound is again passed. Then, at intervals of three or four days, the largest conical steel sound that will go should be gently carried through the whole course of the urethra into the bladder, and this continued at gradually lengthening intervals until the wound has healed—a time generally varying from three to six weeks.

The tube is left in the bladder generally for about four days, after which it is removed permanently, unless on account of the existing cystitis it is desired to afford the bladder the benefit of prolonged drainage, in which case it should be left in place for ten days or two weeks. This necessarily makes a decided difference in the period of confinement, which is otherwise not generally over ten days to two weeks and sometimes less.

After the tube is removed for the first twenty-four or forty-eight hours all the urine passes away through the perineal wound, after which it is divided in varying quantity between the perineal and the natural route. As the wound heals, which it generally does without assistance, the urine gradually passes entirely by the natural route. This sometimes occurs as early as at the end of the first week.

When the patient gets about in from ten days to two weeks his perineal wound requires little care other than ordinary cleanliness and the protection of a pad of absorbent gauze held in place by a T-bandage. If after he is about there still occasionally occurs a little leakage at the perineal wound, it need cause no disturbance as it will take care of itself, and the wound will heal firmly when the patient regains his normal physical tone. If a small fistula persists, it can be successfully closed by

injecting it with the ethereal solution of peroxide of hydrogen, five per cent, as used in fistulous tracts elsewhere (*vide* p. 69).

Finally, when the patient gets well, he must be taught to use a full-sized conical steel sound for himself at such intervals as may be deemed necessary—once a month, once in six weeks, as the case may be—just as after internal urethrotomy or divulsion, or his cure may not be lasting. Many a patient relapses into a condition of impermeable stricture, after having been thoroughly cut in the perineum, either because his surgeon has not impressed him with the necessity of using sounds or because he himself has been negligent in his duty.

But recontraction is not invariable after external perineal urethrotomy. It is possible after the continuous and systematic use of sounds following this operation gradually to lengthen the intervals between the passages and finally to discontinue them without recontraction of the stricture, but it is a wise precaution in all cases to advise the patient of a continued possibility of its recurrence and to urge him as a safeguard to report at long intervals—once a year or two—for exploratory examination.

**Perineal Section without a Guide.**—This operation is a formidable one on account of the element of uncertainty which it involves. Generally

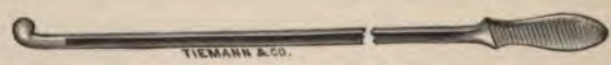


FIG. 84.—Wheelhouse Guide.

speaking, the operation without a guide is easy to a cool-headed surgeon, only a few minutes being required after the front face of the stricture is exposed before a passage into the bladder is obtained; but competent surgeons have worked hours before the bladder has been reached, and the operation should therefore not be undertaken with an undue amount of confidence, but with deliberate and painstaking precision, and under the most favorable conditions for an abundance of light.

The operation calls for the same preparations as if a guide were to be used. Besides the other instruments a few fine probes and directors are also necessary. A last attempt under ether should always be made to pass a whalebone guide. Failing in this, the grooved sound or catheter or Wheelhouse guide is introduced as far as the front face of the stricture, entrusted, with the scrotum, to an assistant, a central incision is made as before, and the point of the sound exposed. When the Wheelhouse guide is used (Fig. 84), the incision is made upon the groove; and after the urethra is opened, the staff is turned around so as to act as a retractor of the upper end of the wound. Two long silk threads, one on each side of the deep portion of the wound to act as retractors, are then passed and the loops handed to assistants.

Now the operator, with fine whalebone or silver probe, searches cautiously on the front face of the stricture for the way of the urethra into

the bladder. To aid him he may enlarge any existing perineal fistula, and try by that route to reach the posterior face of the obstruction within the urethra.

Usually the best guide to the bladder is a clear anatomical understanding of just where the hole in the triangular ligament is, and in what relation that hole stands to the lower edge of the subpubic ligament. This lower edge of the subpubic ligament can always be felt; and beneath it, exactly in the middle line, about three-quarters of an inch below the symphysis, varying a little in different subjects, lies the hole in the triangular ligament. This hole is generally the operator's objective point. The tendency is to cut too much at first and to probe too little, until the operator loses his bearing in the solid mass of tissues matted together by prolonged inflammation; and once fairly off the track, he rarely recovers his position by any other means than accident. Patient and judicious probing, with a little careful cutting in the anatomical position of the closed urethra, is generally rewarded with success; the probe soon passes on without obstruction for a considerable distance in the direction of the bladder, another probe may be pushed alongside of the first, and a separation of these two allows a little bloody urine to flow out. The tight ring surrounding the probes may now be carefully followed up with the knife for a short distance, the area of the canal widens, a female catheter passes readily alongside the probes, and a gush of bloodless urine through it announces that the bladder has been reached.

One of the most common causes of failure in this operation is the existence of a false passage, starting from the front face of the stricture, the result of some former rude attempt to pass the stricture with a solid instrument. The surgeon may be led far astray by such a false route, and find his mistake only after he has hopelessly lost his bearings among the diseased tissues. It is well, therefore, not to follow up any inviting sinus without first dilating it a little and learning whether it leads in the proper direction.

After the bladder has been reached, the operation of perineal section, with and without a guide, are one and the same. Description of the remaining steps is therefore unnecessary, since they have been already given.

The other surgical procedures which have been resorted to when the bladder is greatly distended by acute retention in the case of impermeable stricture are **aspiration** of the **bladder**, **retrograde catheterism**, and **Cocks' operation**.

**Aspiration of the Bladder.**—This should be conducted under strict antiseptic precautions in the suprapubic region. The restricted area through which the needle should be passed is limited to one inch above the brim of the pelvis, and about one inch on either side of the median line. This, however, is ample space for a sufficient number of punctures to carry a case for several days.

This operation is resorted to as a palliative measure in impassable stricture with retention, and may be followed by a decrease in the engorgement of the tissues surrounding the stricture sufficient to permit the passage of a small bougie or catheter, and thus open the way for a subsequent external urethrotomy with a guide or for progressive dilatation. Cases are recorded in which on account of extensive prostatic hypertrophy the bladder could not be reached in the above manner.

**Retrograde catheterism** is performed from the bladder through an opening made above the pubis, in order to reveal the opening of the urethra during a perineal section, when complete obliteration has occurred and a prolonged effort to find the distal end of the canal has been unsuccessful.

**Cocks' operation** is perineal section proper, in which no guide of any kind is employed, not even down to the face of the stricture.

With the finger introduced into the rectum a "boutonnière" incision is made toward the apex of the prostate, trusting to the deftness and anatomical accuracy of the operator to strike the urethra at this point. If the attempt be successful, a cannula is introduced into the bladder and retained several days, in the hope that by the relief thus afforded the swelling and induration about the stricture will subside to a sufficient extent to permit the passage of a small instrument through the contracted area, which if successful may be followed up by division of the stricture or progressive dilatation as may be deemed expedient.

**Extravasation of Urine.**—Extravasation usually occurs as a result of rupture of the urethra during a violent straining effort to overcome the resistance of a tight stricture. The urine is forced into the surrounding tissues, being limited in its course, according to the site at which the rupture occurs, by the anatomical attachment of the fasciæ enveloping the different regions. Thus when rupture occurs in the pendulous urethra it is followed by swelling of the penis, which may be limited within the fascia surrounding the corpus spongiosum, or, overcoming the resistance of this membrane, may extend into the connective tissues of the penis and scrotum. This form of extravasation is rare.

Extravasation of urine in front of the triangular ligament through the bulbous portion of the urethra is limited by the attachments of this fascia and cannot reach the pelvic cavity or the tissues of the lower extremity, but is directed upward over the hypogastrium sometimes to a considerable extent.

Rupture of the urethra in the membranous portion is limited by both layers of the triangular ligament, and on account of the great tension in this limited space due to the strong resistance offered by the fibrous tissues, may lead to suppuration and ulceration and a consequent fistulous tract through one or the other layers of the ligament into the pelvis or toward the perineum.

Finally rupture of the urethra behind the triangular ligament may lead to extravasation around the rectum in the periprostatic region, or going above the prostate may extend into the cellular tissues of the pelvis.

The **symptoms** of extravasation of urine depend upon the locality in which the rupture of the urethra has occurred. The condition is self-evident when the extravasation occurs in front of or behind the triangular ligament, provided the quantity of infiltrated fluid be sufficient to attract notice; otherwise it may pass undetected until other symptoms occur. Sometimes, however, the patient complains of having felt something give way during a straining effort, followed by a certain sense of relief, which is unaccompanied by the normal passage of the urine. Extravasation between the layers of the triangular ligament may not be recognized until further extension of the process occurs or until the onset of constitutional symptoms. These symptoms consist of great depression and weakness, pyrexia and vomiting, sometimes chills; and if the condition continues unrelieved, the vomiting continues, the pyrexia increases, delirium ensues, and death may result from uræmic coma or septicæmia. The local symptoms consist of swellings in the region to which the extravasation has extended, the scrotum may be much enlarged, and the tissues over the hypogastrium and perineum may be tense and red or bluish and dusky and œdematous. Actual destruction of the tissues may occur as a result of sloughing or gangrene. The scrotum sloughs entirely, leaving the testicles bare. The more septic the urine in cases of extravasation the more rapid is the occurrence of the systemic symptoms and the more profound the resulting septicæmia.

**Urinary Fistula.**—Small quantities of urine sometimes escape from the urethra, resulting in urinary abscess and the formation of fistula. Such abscess cavities may persist for a long time, communicating with the urethra. When this outlet becomes closed, a fistulous opening is formed in one or more places—through the perineum, backward into the rectum, or in front of the scrotum.

**The Treatment of Extravasation and Urinary Fistula.**—Extravasation of urine should be met at once by active operative measures. In the first place the tissues involved should be drained by a sufficient number of incisions to relieve distention, and a proper exit for the urine should be provided by perineal drainage of the bladder, leaving the stricture alone until the constitutional symptoms subside, and the engorgement of the tissues is removed as a result of the drainage established. Local cleanliness and antisepsis should be employed to disinfect the decomposing tissues, and such internal medication should be resorted to, in the form of stimulants and supporting agents, as will aid in sustaining the vital powers until the septic poison, which has disorganized the system, shall have been eliminated.

The treatment of urinary abscess, whether or not it is accompanied by

an external fistula, should consist in the formation of an external opening as a means of drainage, and of the establishment of the proper calibre of the urethral canal by dilatation or urethrotomy. Urinary fistulæ, if found during an operation of external urethrotomy or perineal drainage, should be thoroughly scraped or cauterized. In many instances urinary fistulæ will close spontaneously after the pre-existing stricture has been properly dilated; but it often becomes necessary to assist the healing process and for this purpose stimulating applications have been used in the form of nitrate of silver, carbolic acid, or tincture of iodine. Another method—and one which has proved satisfactory in the hands of the authors—is the use of one of the ethereal solutions of peroxide of hydrogen, as employed in the treatment of fistula in connection with periurethral abscess. Some fistulous tracts, which have existed for long periods, are tortuous in their course, and surrounded by induration, may require extensive plastic work before they become permanently healed.

**Urethral or Urinary Fever.**—Urethral or urinary fever is one of the accidents or complications which arise in connection with instrumental interference with the urethra. The phenomena constituting this condition may be trifling or excessively severe. The simple passage of a catheter, the introduction even of a single smooth sound, has been followed by death within twenty-four hours, the patient dying with a high temperature following a chill of varying severity and duration.

Septic absorption along the urinary tract is accused most commonly of being the cause of urethral fever, but this element alone is not the only causative factor of the condition in question. The position of the lesion, the condition of the kidneys, and individual idiosyncrasy have more to do with the production of urinary fever than the condition of the urine, be it ever so septic. The use of instruments upon some persons of a strongly timorous and neurotic nature sometimes gives rise to pronounced reflex symptoms.

Thus after some trivial manœuvre—the passage of a sound or catheter—the patient becomes suddenly pale and faint, sometimes losing consciousness. This same condition occurring in an individual who is the subject of kidney disease has been known to be followed by cessation of the urinary function (anuria) and death from collapse. These phenomena, strictly speaking, do not belong to the condition known as urinary fever, but are more properly considered as a form of shock.

Chronic inflammation of the bladder and urethra and abrasions of the mucous membrane are predisposing factors. The harsh manipulation of instruments seems to act as an exciting cause, as does also the septic condition of the urine. Not one of these conditions alone is sufficient to bring on an attack. The bacillus coli communis is thought to be a common microbic factor, but Rovsing has cast great doubt upon this allega-

tion. Other pathogenic organisms probably also exercise their morbific influence. Operations and explorations upon the pendulous urethra and upon the bladder are rarely attended by urinary fever; the curved urethra is vastly the most vulnerable portion.

Guyon recognizes three forms of urinary fever—one characterized by a sudden and sharp attack, rapid in its course and generally single; second, an attack which is prolonged or repeated, often very intense, and which may be accompanied by remissions; and third, a chronic form of irregular duration, with or without exacerbations. The acute attack of urinary fever, or the first type of the acute form of Guyon, is characterized by a sharp chill; sometimes only chilly sensations, at others accompanied by marked rigors. The duration of the chill is variable, generally twenty or twenty-five minutes, sometimes longer. This is followed by fever, with an elevation of temperature of 102° to 104° F., pulse 110 to 130, possibly irregular, respirations more or less labored, succeeded by sweating and general defervescence. Such an attack may occur with increased severity, the temperature running from 104° to 106° F., or higher, and the systemic symptoms being correspondingly more severe. There is generally a diminution in the secretion of the urine and in severe cases complete suppression, which, if not relieved, may culminate in acute uræmia and death. If the kidneys are sound, a desperate attack does not necessarily entail a fatal issue; if the kidneys are diseased, the prognosis is much more grave. It is probable that a disorganized condition of the kidneys is responsible for the profound symptoms in most severe cases, but, on the other hand, diseased kidneys do not necessarily render a patient unfitted for operation or prone to urethral fever. Many severe operations are done from necessity upon the urethra and bladder of patients known to have defective kidneys, and they seem to escape without chill. Operations upon the deep urethra, when no perineal drainage has been established, are especially liable to be followed by severe urethral fever.

The chronic form of urethral fever occurs in those who have chronic cystitis, atonied bladder, dilatation of the ureters and pelves of the kidneys. The attack is generally more or less continuous, with exacerbations of chill and fever and gradual loss of vitality. If relief be not afforded, or if some additional source of irritation be introduced, such as instrumental violence to the deep urethra, an acute suppression of urine may suddenly ensue and lead to a fatal issue. This condition is particularly liable to be associated with chronic cystitis the result of prostatic hypertrophy, and the introduction of a catheter for the first time without proper precautions is often responsible for its production. The prognosis under such circumstances is exceedingly grave. When it occurs in connection with chronic cystitis behind an old and tight stricture, the symptoms may be somewhat the same as in prostatic hypertrophy; but, occurring in younger men, the prognosis is not so grave.

**Treatment.**—The prophylaxis of urinary fever calls for the most gentle instrumental manipulation in connection with operations or operative manœuvres upon the urethra and bladder and a careful disinfection of all instruments employed. It is also important to make a careful urinary study of all cases under examination, in order to learn the condition of the bladder and of the kidneys. Internal medication as a preventive means is also useful previous to an examination or operation for stricture. The sulphate of quinine was formerly employed in full doses for this purpose, but is not at the present day relied upon, being commonly replaced by one of the internal antiseptics. Salol, from grs. xxx.–lx., may be given several days before and for several days following an operation. Boracic acid, from grs. xxx.–l. daily, is also used, or urotropin, grs. viiss. three times a day. At the time of the occurrence of a urinary attack during the chill the patient should be thoroughly covered, surrounded with hot-water bottles, and given a hot drink. The mild attacks are generally of only a transient nature, and the patient suffers from no serious after-effect. It is only when severe symptoms occur, such as great depression, extreme pyrexia, acute and continued suppression of urine, that active therapeutic measures have to be resorted to. If there be evidence of acute inflammation of the kidneys the application of cups to the loins and hot vapor baths are indicated, but the most important symptom to note and overcome is the incomplete functional activity of the kidneys, amounting sometimes to positive suppression. For this condition one of the most reliable and satisfactory resources is the copious ingestion of some diuretic mineral water, such as Poland, Stafford, Bethesda, Suwannee, etc. This measure alone often results in starting the activity of the urinary organs and in aiding them gradually to resume their normal function. Urotropin, which has already been referred to (p. 94) as an internal antiseptic, has proved in the author's hands to be a valuable agent for post-operative suppression of urine. Its action in this instance is probably due to its germicidal effect. It should be given in gr. viiss. doses, repeated three, four, or six times in twenty-four hours. Sometimes the effect is most satisfactory. The use of active diuretics is not generally advisable, as they are liable to exercise an irritating influence upon the kidneys. The infusion of broom and the liquor ammoniæ acetatis may be given, and possibly render some service, but in the majority of cases we believe that the greatest reliance is to be placed upon the copious draughts of diuretic mineral water, a mild diet, preferably of milk, and the administration of urotropin. In weak and enfeebled conditions stimulation and tonics are called for. Under this *régime* the milder cases will always recover, and many of those which appear very severe at the onset and during the attack. Those cases that suffer from disorganized and diseased kidneys are often beyond reach of any reparative measures.

# CHAPTER VII.

## GONORRHŒAL RHEUMATISM—NON-SPECIFIC AFFECTIONS OF THE EYE—PURULENT OPHTHALMIA.

### Gonorrhœal Rheumatism

Occurs as a complication of gonorrhœa in both sexes. It is also found in connection with purulent ophthalmia. It is much more common in men than in women, and occurs at all ages. It bears no relation to ordinary rheumatism, usually involves the joints, but may attack the tendon sheaths, muscles, structures of the eyes, bursæ, and nerves. Cases of gonorrhœal pericarditis, endocarditis, and meningitis are also recorded. Its frequency as a complication of urethritis is not great, being between two and three per cent of all cases. According to the statistics tabulated by various authors the different joints are affected in about the following order of frequency: Knee, ankle, wrist, fingers, elbow, shoulder, hip, etc. It is more often polyarticular than monarticular. It rarely occurs early in the course of urethritis, being usually a late complication. It has been observed as early as the fifth or sixth day of the discharge, but such a case is exceptional. It is more likely to come on after the second or third week, and is often seen two and three months after the onset of the urethral inflammation. Its cause is the toxæmic effect of the gonococcus upon the system, either directly by its presence in the circulation or of the toxins derived from this micro-organism; or by one or the other of these morbid agencies, plus the action of the ordinary pyogenic microbes in the circulation, the gonococcus having prepared the way for their entrance. The gonococci are not invariably found in the fluid obtained from the inflamed joints. It is believed that when the gonococci themselves are present, the character of the inflammation is fibrous and plastic; that when the joint effusion is purulent, pyogenic organisms are present. The pathological lesion in the joints consists of a synovitis, which may be serous, plastic, or purulent. A common form of this malady is hydrarthrosis, which often attacks the knee-joint. It generally occurs on one side, assumes a chronic form, and shows a tendency to relapse during subsequent attacks of urethritis.

**Symptoms.**—There is nothing distinctly characteristic in the symptoms of gonorrhœal rheumatism. The condition may be acute, subacute, or chronic. The local manifestations may be monarticular or polyarticular.

When the affection is acute and a single joint is involved, for example the knee, the joint becomes swollen and painful as in ordinary rheumatism, and there may be some slight febrile symptoms. Local pain is decidedly increased by moving about. When the effusion is of a plastic character the symptoms are more marked; and still more so when the inflammation becomes purulent. In polyarticular gonorrhœal rheumatism the symptoms are not increased in proportion to the number of joints involved, and the intensity of the inflammation is not more marked in this form of the malady.

The symptoms of gonorrhœal rheumatism may be very mild, simply amounting to a little stiffness of the joints on moving, especially in the morning. On the other hand, a much more intense condition may arise, occasioning considerable spontaneous pain in the affected joints, with redness of the skin and swelling, presenting all of the features of ordinary rheumatic gout. The affection generally tends in a few days to become subacute in character and then to assume its customary march, which is one of tiresome chronicity. It is usual for several joints to become involved consecutively, but the trouble continues in the old joints and does not leave them when the new ones are invaded.

Another form assumed by gonorrhœal rheumatism is inflammation of the muscles, sheaths of tendons, bursæ, and nerves. These affections also tend to become chronic, a number of weeks or even months sometimes elapsing before they are brought under control. The bursæ most often implicated are located under the tendo Achillis, under the inferior tuberosity of the os calcis, in front of the patella, and behind the olecranon. These tendon and bursal affections may assume an acute, subacute, or chronic character, and are apt to be found complicating the polyarticular form of gonorrhœal rheumatism.

The **diagnosis** of gonorrhœal rheumatism depends upon the pre-existence of urethral inflammation, which would naturally suggest the nature of the malady, the mild systemic reaction and febrile disturbance as compared with acute inflammatory rheumatism, and the tendency of the affection to become chronic. There being no connection with ordinary rheumatism the rheumatic diathesis is likely to be absent. The larger joints are favorite sites of this malady, and hydrarthrosis is a not uncommon form.

**Prognosis.**—As already stated, the general tendency of this malady is toward chronicity, relapses occurring in connection with subsequent attacks of urethral inflammation. The duration of the active period of the disease is generally rather long, and increased in proportion to the number of joints attacked. When the effusion is plastic or sero-purulent the case becomes thereby so much the more protracted and the function of the joints is more likely to become impaired or abolished.

Cardiac complications are alway serious and may lead to a fatal issue.

**Treatment.**—The treatment of gonorrhœal rheumatism comprises meas-

ures directed against the urethral inflammation and those which are applied to the arthritic complication. It is most important that the urethral condition should be properly treated, as upon the success of such treatment may depend the improvement in the rheumatic affection. Nitrate of silver is a favorite local application for the urethra, and if there be a free amount of purulent secretion, either forward in the urethra in the form of a discharge or backward into the bladder as shown by the urine, irrigations of nitrate of silver into the bladder, 1:4,000, or of the permanganate of potassium, 1:6,000, or of corrosive sublimate, 1:12,000, may prove more effective than instillations of silver, which are generally more suited to cases in which the focus of the urethral trouble appears to be confined to a small area. In the latter instance the nitrate of silver in the form of deep urethral instillations by the method already described in the section on chronic urethritis may prove satisfactory. Balsams and alkalies are of little value. Opium should be given in some form if the pain demands it. Salicylate of sodium, oil of gaultheria, or iodide of potassium may be given in proper doses, sometimes with apparent benefit. The plan of drinking freely of a diluent mineral water is the best means of correcting the tendency of the urine to become scanty and highly concentrated. The local measures called for by the joint itself consist, in the first place, in absolute rest. Cold evaporating lotions in most cases and flaxseed poultices in others are suitable expedients and the means of securing a certain degree of comfort. When the acute condition has subsided, the remaining trouble in the joints, tendons, and bursæ should be treated by friction, massage, galvano-cautery, electro-massage, dry heated air, blisters, and such other methods as are generally resorted to for the removal of inflammatory deposits and the treatment of dry arthritic conditions under other circumstances. Suppuration in the joint may require aspiration or drainage, and may ultimately end in impairment of the joint structure and lead to permanent ankylosis.

## Non-Specific Affections of the Eye

During the course of polyarticular gonorrhœal rheumatism or alternating with it, during different attacks of urethral inflammation, affections of the eye have also been noted. They involve the iris, conjunctiva, sclera, and cornea. These ocular affections are in no sense due to contagion, but occur in the same manner as the arthritic inflammations and appear as complications of them. They get well without compromising the structure of the eye or its function, but are liable to relapse during subsequent attacks of urethral inflammation. When the eye is attacked by this non-purulent form of inflammation in conjunction with urethritis, the cornea becomes somewhat cloudy and is apt to grow more prominent from overdistention with fluid. The iris is likely to be the

main seat of the trouble, although it does not show much change in color. The pupil may be slightly dilated and irregular or normal. The movements of the iris are partially or entirely abolished. The conjunctiva alone may be the seat of an injection, which is marked by a slight redness and swelling, some uneasiness, or perhaps by no pain at all, and a scanty muco-purulent discharge. This should not be confounded with the virulent contagious form or ophthalmia. All of these affections of the eye are distinguished from the virulent form, due to contact with gonorrhœal pus, by the great intensity of the symptoms in the latter malady.

The **treatment** of the eye affections which occur as complications depends upon the nature and extent of the inflammatory condition. If the conjunctiva alone is involved, it may be sufficient to cleanse the eye frequently with a proper lotion consisting of normal salt solution or a solution of one grain of sulphate of zinc to the ounce of camphor water, and the use of a shield to protect the eye from the light. If the deeper structures of the eye are attacked, involving the distention of the anterior chamber, the latter may require tapping. When the iris is involved, instillation of a solution of atropine should be used daily to keep the pupil dilated. In more severe attacks, when the inflammation becomes intense, a leech may be applied to the temple or a blister behind the ear. Anodynes should be administered in proper quantity. In chronic cases the condition of the patient generally calls for the use of tonics, change of air, and a nutritious diet, which course should be rigorously adopted for obvious reasons.

### Gonorrhœal Ophthalmia.

This virulent inflammation is always due to the direct transference of gonorrhœal pus from the diseased urethra to the eye, perhaps the patient's own eye, perhaps the eye of another. It also attacks the eyes of infants, having been acquired during birth from gonorrhœal pus in the vagina.

In most instances this affection is the result of carelessness on the part of the patient, who failing to exercise proper precautions in cleansing the hands after handling the genitals, either in a moment of thoughtlessness or during sleep, infects one or both eyes by the contact of the fingers. The surgeon is guilty of contributory negligence who does not impress upon the patient the danger of contamination and the importance of absolute cleanliness of the hands after handling the penis infected with gonorrhœa. The gonococci are the causative factors of this virulent inflammation. There is said to exist a milder affection caused by inoculation with some of the pyogenic microbes obtained from vaginal or urethral discharges which are not gonorrhœal.

Fortunately, gonorrhœal ophthalmia is rare, doubtless due to the fact that the danger to the eye of contact with gonorrhœal pus is quite gener-

ally understood. The disease is not often double at the start, but it is very apt to become so during its course, unless great care be taken to shield the well eye while the other is being treated.

**Symptoms.**—Within a few hours after contagion the eye feels dry and itching, as if sand were beneath the lids. The eye waters a little from the start, and the conjunctiva promptly becomes red, the lids slightly œdematous.

The pain, swelling, and discharge increase with alarming rapidity. The upper lid swells so much and so rapidly that it soon completely covers the lower lid, and lies out prominently upon the cheek, red and œdematous.

The conjunctiva beneath is the seat of œdematous swelling. It becomes highly vascular, looking raw, sometimes livid in color, raised into a thick border around the cornea (chemosis), which lies at the bottom of the cavity formed by the swollen conjunctiva, generally bathed in pus.

The pus, green and thick, flows out abundantly upon the cheek, thinned from time to time by a gush of tears, sometimes tinged with blood. The lids partly stick together with the thick incrustations of matter which incessantly flow away. The epithelium upon the cheek becomes sodden and perhaps excoriated with the acrid secretions.

The cornea soon gets into difficulty from strangulation by the chemosis. It becomes at first infiltrated, then softened at the edge at points underlying the swollen conjunctiva, and so rapidly do the morbid changes occur that within twenty-four hours from the commencement of the affection the cornea may have ulcerated to the point of perforation. Abscess may form in the cornea and discharge externally, followed shortly by a giving way in the posterior wall of the abscess, which allows the fluid to escape from the anterior chamber and the iris to protrude at the opening. Again, the whole cornea may ulcerate peripherally and drop out like a watch-glass, and this may be followed by an escape of the crystalline lens and suppuration, with destruction of the entire contents of the globe.

Meantime, pain is often most intense and photophobia extreme. The pain is felt not only in the eye but all around it. There may be little or no fever (unless the globe suppurates), but profound depression is the rule. A sense of some impending catastrophe seems to overwhelm the sufferer.

The **diagnosis** and **prognosis** of gonorrhœal ophthalmia depend upon the presence or absence of the gonococci in the discharge from the eye. Other forms of virulent ophthalmia may be so intense as to simulate strongly the gonorrhœal form. The microscope will settle the question beyond doubt and should always be resorted to at the onset of the malady, as the prognosis of gonorrhœal ophthalmia always depends upon its early recognition and prompt and vigorous treatment.

The less virulent form, not due to gonococci, is not a grave disorder, and much less likely to lead to the serious consequences which are so sure

to follow rapidly in the wake of an untreated attack of true gonorrhœal ophthalmia. In this latter case the prognosis given should always be a grave one. When active treatment is established at the onset of the inflammation the chances of recovery are good, while the restoration of the sight in one or both eyes is exceedingly doubtful after ulceration of the cornea has occurred. Incomplete destruction of the structure of the eye may leave the eyesight only partially impaired, and deformities may remain which are amenable to operative treatment.

**Treatment.**—When one eye is found to be the seat of contagious purulent ophthalmia, it becomes the physician's duty immediately to protect the other eye.

The curative treatment of purulent contagious conjunctivitis rests upon cleanliness, relief of strangulation, and arrest of suppuration.

Cleanliness must be maintained through the whole course of the affection. Frequent application of cold compresses is to be practised, and the discharge continually washed away with saturated boric-acid solution or corrosive sublimate, 1:10,000. These washings may be repeated, with advantage hourly, or at such intervals as may be called for by the accumulation of pus. Anything that touches pus from the eye should be burned and the nurse cautioned to preserve her own eyes against contagion, preferably by wearing protective spectacles.

Thin compresses, soaked in iced water and constantly changed, should be applied to the eye. A night nurse, as well as a day nurse, is called for to perform this arduous task. The constant application of cold to the eye is of great importance, and the means which can effect this most continuously should be employed. Small quantities of pounded ice, tied in a piece of rubber tissue, serve well in most cases, but after the vitality of the cornea is threatened and ulceration has commenced, it is well to be prudent in the use of ice or to suspend it altogether.

Among the local applications used with the view of keeping down pus formation, the nitrate of silver in solution holds the first rank. It is of value when the pus begins to be freely formed, and the strength of solution employed, as well as the frequency of the applications, is decided by the violence of the flow of pus and by the effect of the applications upon it. It is best to use the nitrate of silver in solution, on account of the difficulty of touching all parts of the inflamed conjunctiva with the solid stick. It is well to employ two solutions. one quite mild, from three to six grains to an ounce of water, to be applied every two or three hours; and another, much stronger, from ten grains up to a drachm in an ounce of water, to be applied at intervals when the secretion of pus becomes too considerable to be held at all in check by the milder solution. The strength of the caustic solution of course must be regulated by its effect upon the pus-forming process. If a reasonably mild solution will hold it in check, so much the better; if not, recourse may be had at each

application, after an interval of eight to twelve hours, or longer if the solution is quite strong, to a solution of greater strength, until the desired effect has been attained, after which the intervals between the applications may be lengthened or their strength diminished.

In making applications of the nitrate of silver to the conjunctiva, the lids should be everted as much as possible, and the application made in the main upon the palpebral conjunctiva; that upon the globe is of less importance, and every effort should be made to avoid getting any of the solution upon the cornea already devitalized by the strangulation of the vessels supplying its nourishment, and especially since it may permanently discolor the cornea. The conjunctival culs-de-sac stand in especial need of the applications, which can hardly be made too thoroughly at these points. After each application of the nitrate of silver the eye should be freely brushed over with a strong salt solution to neutralize all excess of the nitrate of silver which may remain in the eye. Cold compresses upon the eye after each application of caustic will help to allay the pain.

When the conjunctiva and lids swell much, the eye suffers from tension in two ways: by the tightness of the tarsal border which irritates the eye and prevents a free outflow of the discharges, and by the chemosis of the conjunctiva which strangulates the cornea. Both of these strangulations may and should be relieved, the first by freely cutting the outer canthus, enlarging the palpebral slit; the second by deep and thorough scarification of the chemosed conjunctiva.

The cornea requires especial attention. The cup at the bottom of which it lies should be washed out, and the edge of the cornea all around under the overhanging chemosed conjunctiva should be frequently inspected, to detect the commencement of abscess, or of the ulcerative process. As soon as rupture of the anterior chamber seems imminent, the escape of the fluid should be anticipated by paracentesis of the cornea, and the incision should be kept fistulous, if possible, by the use of a fine probe, until the cornea is out of danger.

A solution of atropine should be dropped into the eye several times a day from the first. It tends to diminish intra-ocular tension, to reduce pain, and to keep the iris out of harm's way, either from adhesion or from prolapsing into any fortuitous opening in the cornea, due to the perforation of an ulcer. Should such prolapses occur, any portion which projects may be cut away. Adhesion of the iris to the cornea at the point of prolapse is quite certain to take place, calling perhaps for iridectomy when the patient recovers.

As the eye begins to recover, it must be shaded from the light and tenderly nursed for a long time. The lotions of nitrate of silver may be gradually reduced in strength, and finally substituted by mild solutions of sulphate of zinc, or alum, or by normal salt solution. An eye may come out of the contest much damaged, but yet capable of being nursed

up to the point of being of considerable use to its possessor. In bad cases vision is totally destroyed.

The internal treatment should be supporting and tonic throughout, all the energy of the treatment being devoted to the local measures. Mercury, up to the point of producing salivation, has been advised in bad cases in which there is a diphtheritic tendency, but the suggestion by no means receives the uniform indorsement of authorities, and is of questionable propriety, certainly so far as regards a majority of the cases seen in cities where the vitality of the individual is not high. The malady itself is unquestionably very debilitating, and tonics and good food are called for more than any other internal remedies. Laxatives are usually required, with a judicious use of anodynes to insure sleep and control pain.

# PART II.

## CHANCROID AND SYPHILIS.

# CHAPTER I.

## CHANCROID.

### Definition, Etiology, and Clinical History.

**Definition.**—Chancroid is a virulent ulcer, purely local in character. It is always due to inoculation of the surface with pus derived from a similar ulcer, and its own secretions are freely auto-inoculable.

These characters are cardinal and uniform. Clinically, a chancroid does not exist which does not fulfil each of these conditions. This statement applies to the genuine type of this local venereal sore. The name of chancroid is sanctioned by long usage and generally adopted in this country. It is otherwise spoken of as the "soft chancre," as distinguished from the "hard chancre," or primary syphilitic lesion. These latter names are to be discouraged for general usage as they imply distinctive characteristics—"soft" and "hard"—which are not invariably to be found in all instances of these two lesions, but on the contrary are sometimes reversed. The fact should not be lost sight of, however, that the characteristic of "hardness" or induration generally belongs to the structure of the "syphilitic chancre," and that the existence of a condition simulating it, in connection with chancroid, is exceptional.

Chancroid possesses an individuality as clear and distinct as either of the other venereal diseases—gonorrhœa and syphilis. The history is not so ancient which relates how it successfully passed through one era of obscurity, during which it was attempted to merge the two distinct diseases, chancroid and syphilis, into one family. This one time vexed question has been settled beyond all doubt or cavil. No possible relation exists between these two maladies, as was demonstrated by the energetic campaign inaugurated by Ricord and culminated by Bassereau.

An attempt to trace the history of chancroid has given occasion for the display of much erudition. No author has been more painstaking in this direction than Bassereau,[1] who brings out evidence from the writings of ancient Greek, Latin, and Arabian surgeons which establishes the presumption that contagious venereal ulcers have existed from all time; and that some at least of these ulcers were chancroidal, it is hardly reasonable to doubt.

*Description.*—A typical chancroid, unirritated and uncomplicated, is

[1] "Traité des Affections de la Peau symptomatiques de la Syphilis," Paris, 1852, p. 217 et seq.

a rounded ulcer. In a furrow it is oval, large or small, single or multiple, simple or composed of several ulcers which have run together. A faint pink areola surrounds its edges which are abrupt, sharply cut at right angles to the surface (not sloping away), and very often undermined, because the superficial integument resists the advance of the spreading ulcer a little longer than the less dense underlying structures. The bottom of the ulcer is either pallid, with pink granulations, bathed in thick pus, or, more often, pultaceous, yellow, looking like dirty cream; and this surface, composed of sloughy structures, permeated with pus, is adherent, and blood flows on any attempt at its removal. The base of the ulcer can be easily lifted up from the tissues beneath, and, although consisting of an inflammatory œdema, when rolled between the thumb and finger presents no marked rigidity.

The pus is creamy and freely secreted from the ulcerated surface, and contains the broken-down detritus of the anatomical elements which have been involved in the progressive march of the destructive ulcer. There may be no pain associated with it except from handling or friction, or during erection.

Such is the simple clinical chancroid as seen in a typical case. Complications, however, may attend it and subject its appearance to variations. The more it differs from this type, the less possible is it for the surgeon to be positive in his diagnosis.

It is therefore of the first importance, in the study of venereal disease, to comprehend what a chancroid is and to what variations it is liable, especially in these modern days when every ulcer produced by inoculation finds some sturdy advocate ready to proclaim it a chancroid.

*Varieties.*—The typical chancroid, as described above, is generally superficial and round, or may be unsymmetrically irregular on account of the situation, or the shape of the abrasion or fissure inoculated, or on account of the running together of several chancroids of different sizes, in which case its border is irregular and uneven. This is the *exulcerous* lesion. Multiple chancroid of the anus is stellate.

Instead of being an open ulcer, chancroid sometimes remains scabbed over. The thick pus dries up on the surface, but continues to be formed beneath the scab, from the sides of which it oozes under pressure. It advances by the formation of new rings of pus under the epidermis around the old scab, and generally has a livid areola outside of all. It is by no means common, is called *ecthymatous* chancroid, and is more apt to be found on the integument. Lift off the crust in such a case and the characteristic ulcer will be revealed.

In *follicular* chancroid, infection takes place through the mouth of a healthy follicle. It is a clinical sore, and cannot be produced artificially. Inoculation takes place beneath the plane of the surface, and if the latter happens to be tough it retains its integrity for a considerable

period. When first seen it is a large acuminated pustule which varies in size, and is full of thick pus. Suppuration tends to spread peripherally beneath the epidermis until the latter has broken or is cut away, when the typical chancroid is disclosed. The incubation period of follicular chancroid is naturally long.

The base of an unirritated chancroid is soft. If inflamed from irritation, it becomes hard, indurated, and elevated above the surrounding plane. In this form it is spoken of as the *ulcus elevatum*. This induration sometimes cannot be distinguished with certainty from the induration of syphilitic chancre. Generally, however, the difference is striking. The induration of chancroid is manifestly an inflammatory affair. The integument is discolored for a certain distance around the edge of the ulcer, with a distinct inflammatory blush. The edge of the induration is not sharply defined, but fades away insensibly into the surrounding tissues. Pressure upon the induration causes pain. The typical induration of a syphilitic chancre is a tense, elastic, insensitive, non-adherent, sharply defined underlying induration so familiar to the fingers once accustomed to it, and yet so difficult to be certain about in all cases in which it is imperfectly developed. The induration of syphilitic chancre often precedes the ulcer, or occurs simultaneously with it. That of chancroid always follows the ulcer.

When the inflammation of chancroid is intense and rapidly attacks the surrounding structure, causing sloughing or gangrene of the tissues, it is called *phagedenic chancroid;* and when it becomes more or less chronic, is continuously progressive and irregular in its course, sometimes healing in one portion while it extends to another, it is called *serpiginous.*

*Pathological Histology.*—The minute structure of chancroid, as revealed by the microscope, presents nothing peculiar. The tissues of the cutis and of the epidermis are swollen, the adventitia of the blood-vessels is dense, and the walls of the capillaries are thickened. The area involved by the ulcer is infiltrated with round cells crowded together in the meshes formed by separation of bundles of connective tissue. This infiltrate extends into the tissues beyond, involving the neighboring papillæ. The ulcer rests upon a bed of inflammatory œdema, its floor is unevenly dented with rounded or rugose granulations and covered with a membranous pellicle. Like the blood-vessels the lymphatics are increased in number, and their openings present upon the surface of the ulcer.

**Etiology.**—The true nature of the poison of chancroid has not been revealed. Different observers have endeavored to discover the specific micro-organism which is the essential cause of chancroid, but no convincing demonstration has yet been given of its discovery, and the profession to-day is as ignorant upon this subject as it is also of the specific microbe of syphilis. There is a growing tendency to disclaim the exist-

ence of a distinctive poisonous quality in chancroidal pus. R. W. Taylor,[1] of New York, in conjunction with his late colleague, Dr. Bumstead, who years ago read an able paper[2] before the International Medical Congress on this subject, and several other well-known authors, have advanced the doctrine that the inoculation of the products of simple inflammation may produce chancroids notably upon persons who are syphilitic or much debilitated.

But why an ulcer, let it resemble a chancroid perfectly—produced upon a person in a healthy or debilitated condition by the inoculation of indifferent inflammatory pus—should be called a chancroid, even although the pus be repeatedly auto-inoculable, is difficult to understand. The auto-inoculability in generations of pus simply confirms the well-known fact that all pus is more or less septic.

If chancroid could be produced *de novo* by the inoculation of ordinary pus, the number of chancroids clinically observed upon respectable people, and those syphilitic, cachectic, or otherwise, would be vastly greater than it is.

Those who dissent from the opinion that the chancroidal ulcer is not caused by a specific virus do so on the ground that inoculation with pus containing ordinary micro-organisms may produce a sore indistinguishable from chancroid, and one which is auto-inoculable; that the common pyogenic microbes are always found in chancroidal ulceration, and that the existence of a special organism has never been satisfactorily demonstrated. On the other hand, it may be stated that chancroid has distinctive qualities which cannot be explained by the "peculiarities" of the tissues upon which it is found. It is always highly contagious, much more virulent, and its pus more freely inoculable than that of other ulcerations. So great is its virulence, it has been found, that even after considerable dilution its contagious element remains. Puche with a drop of chancroidal pus diluted in a half glass of water has produced a typical chancroidal ulcer.

The existence of specific urethritis can hardly be denied on the ground that there exists a non-specific inflammation closely resembling it, yet this ground is taken to deny the existence of a specific element in chancroid. While the ordinary pus organisms may be found in every instance of chancroidal sore, some observers claim to have found in addition in all cases examined by them a distinctive microbe. The failure to produce conclusive testimony regarding the specific nature of such a micro-organism might well be due to the lack of the suitable culture medium. It was for a long time impossible to obtain a pure culture of the gonococcus on this account, and it is only of recent years that it has been satisfactorily accomplished. Finally, when the chancroid is thoroughly cauter-

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[1] "Venereal Diseases," Lea Brothers, 1895.

[2] Transactions of the International Medical Congress, 1876.

ized early enough in its life to include in the slough all of the infected tissue, a healthy granulating sore is left, which ceases to be destructive and loses its intensely inoculable quality.

Various writers hold opposite views on this subject. Taylor in this country stands in strong opposition to the belief that a special microbe is responsible for the existence of chancroid, and holds that it is due to the ordinary pus organisms found in all suppuration. Finger, of Germany, is apparently in accord with the views of Taylor. Martin,[1] of Philadelphia, writing upon chancroid in 1893, stated that the question was still *sub judice*, but that ultimately the specific microbe would be found. A later work, in which he is an associate author, at the opening of this subject states: "It is generally accepted that chancroid is a simple ulcer caused by the inoculation of the well-known pyogenic microbes," and further along that the question is "still in doubt."

The early writings of Fournier, Keyes,[2] and others record their belief, as a result of exhaustive study on the subject, that chancroid is a distinctly unique local venereal sore due to a specific poison, and at the present time these authors, while accepting the premises adduced by opponent thinkers, that pus obtained from simple ulcerations and pustules is often freely inoculable, have not found sufficient reason to alter their views.

A number of serious workers and scientific investigators express their convictions on the subject more definitely in describing an organism which they have isolated and studied, and believe to be the specific microbe of chancroid. One of the earliest of these, Ducrey,[3] describes an organism found by him constantly in the discharge of chancroid, which was also found by Unna[4] in the lymph spaces. Other workers on the same lines confirm their results.

The organism in question is a streptobacillus, being a rod-shaped body with rounded extremities, which is grouped for the most part in chains. It has never been successfully cultivated, possibly for want of a suitable medium, and therefore a pure culture has not as yet been obtained.

At the present writing it must be admitted that the evidence in favor of this being the specific micro-organism of chancroid lacks convincing demonstration.

*Inoculability.*—The inoculability of true chancroidal pus is virulent and rapid. Such pus takes at once upon the person bearing the sore,

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[1] Morrow: "System of Genito-Urinary Diseases," etc.; White and Martin "Genito-Urinary and Venereal Diseases," Philadelphia, 1898.

[2] "Venereal Diseases," William Wood and Company, 1880.

[3] Comptes Rendus du Congrès Internat. de Derm. et de Syph., Paris, 1889, p. 229.

[4] Monatschrift für prakt. Dermat., vol. xiv., 1892, p. 485.

demonstrating its auto-inoculability in an unmistakable manner. The healthiest individual may be made the subject of experiment—an experiment always successful unless the capacity of the tissues to respond has been overcome by prolonged inoculations as in syphilization. A chancroid is not indefinitely auto-inoculable; the capacity of the skin to furnish ulcers upon local irritation of the proper sort has its limit. The early investigators were too positive in their statements about chancroidal pus. Truly it is very virulent. A patient in high fever (typhoid) will take it; cancer, leprosy, a previous chancroid, none of these prevent a take if chancroidal pus be properly inoculated; but the "syphilizers" have clearly demonstrated that the skin may be worn out in its capacity of responding to the repeated inoculation of chancroidal or other pus. After a period of rest the skin will act again upon inoculation, and the patient then may be repeatedly inoculated until again the inoculation will no longer take. Syphilization or repeated inoculations with pus presumed to be syphilitic, is a practice introduced at a time when the distinction between chancroid and chancre was not generally recognized, and was employed in the hope of preventing the development of syphilis by producing an immunity of the skin against the absorption of the syphilitic virus.

Different parts of the body show a varying susceptibility to the inoculation of the chancroidal virus. The thighs are more susceptible than is the abdomen, and the face is less so than either one of these other regions.

Although the chancroid is an auto-inoculable ulcer, an auto-inoculable ulcer is by no means necessarily chancroid. Pus which is not chancroidal may be re-inoculated upon another person, or may produce a series of auto-inoculable ulcers upon the same individual. A great difference also is found in individuals—some take easily, some with difficulty, some not at all. Syphilitic and cachectic persons form the best subjects for inoculation. A syphilitic chancre which is irritated into suppuration may also be auto-inoculable, producing a pustule or an auto-inoculable ulcer (non-syphilitic). Here it is evidently the pus which is the inoculating agent and not the secretion of the chancre. A syphilitic chancre of pure type does not suppurate at all, and the inoculation of its serous discharge does not produce an auto-inoculable ulcer. There is nothing strange in the fact that chancres irritated into suppuration become auto-inoculable since the pus of scabies and the pus of ecthyma have the same effect.

Then, again, the discharge of an inflamed syphilitic chancre by "hetero-inoculation" upon a healthy subject may produce nothing, or a simple ulceration or pustule in the same manner as above.

These facts are adduced as arguments against the claim that chancroid is dependent upon a specific virus, but they illustrate only the generally accepted teaching in regard to all pus. It has been demonstrated that chancroid may be transmitted by inoculation to the lower animals, and

that the poison which develops there may be carried back again and successfully inoculated in man.

As in the human subject, repeated auto-inoculation in animals soon results in a temporary immunity against reproduction of the ulcer.

*Relative Frequency.*—Statistics drawn from hospital and dispensary experience show that among the class of patients who frequent these institutions the frequency of chancroid is far greater than that of syphilitic chancre. In private practice, however, this order of the frequency of chancre and chancroid is reversed. Herpetic troubles are certainly more common on the whole than either chancre or chancroid, and are frequently mistaken for the latter.

The conclusion is, as Fournier has pointed out, that the greater care and neatness exercised by the higher classes protect them in a measure from chancroid, but offer no guaranty against infection by the seemingly less formidable primary lesion of true syphilis. This conclusion becomes especially obvious on considering the fact that mucous patches, which may lie concealed high up in the vagina and last for months at a time, are as capable of communicating syphilis as is the true syphilitic chancre.

*Manner of Contagion.*—Chancroids develop only from contact of chancroidal pus with a surface deprived of epithelium.

There are two exceptions to this rule, one in which chancroidal pus is placed upon a healthy surface, remains there undisturbed, erodes the epithelium by virtue of its acridity, and thus prepares a way for the absorption of the virus, and the other in which a little chancroidal pus gets into the mouth of a healthy follicle (see Follicular Chancroid). The period of incubation in both cases is unusually long.

The methods of contagion are two, direct and mediate.

In direct contagion the source supplying the pus and the part inoculated come into direct contact. This is the usual way. In sexual intercourse, when a chancroid upon an individual inoculates a portion of overlying contiguous integument, when a fissure on the physician's finger becomes contaminated while practising the vaginal touch—these are instances of direct contagion.

Mediate contagion means that there is an intermediate carrier of the pus which receives it from its source and deposits it where it finally takes root. The vagina may be the medium of contagion receiving the pus from one man to give it up to another immediately without itself becoming contaminated, but this must be rare. The prepuce may play a similar intermediate part. The lancet of the surgeon gives rise to mediate contagion in cases of inoculation.

The pus of chancroid remains virulent until the ulcer is healed, but decreases in virulence toward the end. Frozen and corked up in bottles, the pus retains its virulence for a long time (Boeck). Boiling heat, acids, alkalies, corrosive sublimate, alcohol, decomposition—all destroy

the virulence of the pus. Boeck believes that dried pus is inert; Sperino taught the contrary.

Inoculation is spoken of under two heads—*auto- and hetero-inoculation.* Auto-inoculation is the inoculation of the patient with the secretion of the chancroid he himself bears. This may be effected purposely as a test by the surgeon. It may take place by contact of adjacent surfaces. In such a case it is called spontaneous auto-inoculation. Auto-inoculation as a diagnostic test is not so commonly employed now as it was formerly. As a test it is thought to be deceptive, since so many other kinds of pus produce ulcers upon some persons. These latter ulcers are not chancroids, but they secrete pus and are apt to deceive.

Yet auto-inoculation is still an excellent resource in some cases, the frank take of the true ulcer being very characteristic and always easy to obtain upon a fresh subject—a fact which cannot be affirmed to the same extent about any other kind of pus.

A point suitable for auto-inoculation for diagnostic purposes is the breast below the nipple. A true chancroid will undoubtedly always take here, but the resulting sore is not apt to be troublesome, and phagedæna is almost unheard of in this region.

Hetero-inoculation is the inoculation of pus from one patient to another, as practised by syphilizers. Chancroid, as found clinically, is also the result of hetero-inoculation.

**Clinical History.**—Probably, changes in the tissues commence immediately upon contact of the virus with a denuded surface. By the end of twenty-four hours the inoculated point is distinctly red, during the second or third day a pustule forms, and generally by the third day, if the pustule be broken, a fully formed typical chancroid is found, with its abrupt margin, suppurating floor, soft base, pink areola, etc. When first found by the patient, it is generally already an ulcer or an exulcerated fissure. Sometimes it is a pustule.

Clinically the incubation period of chancroid should be placed at two or three days, very rarely longer. It may reach a week, possibly ten days in cases of follicular chancroid, or when the pus has been deposited upon unbroken epithelium and has to erode its way through before it can take effect. Sometimes the ulcer is not found by an unobservant patient until many days have elapsed, because it has caused no pain and has not attracted attention.

Uncomplicated chancroid tends to run through three definite periods: the *period of increase*, the *stationary period*, the *period of repair*.

*Period of Increase.*—This lasts one or two weeks, occasionally a little longer. The ulcer preserves its characteristic features as it increases in size. It generally stops when it reaches about one-fourth of an inch in diameter, but may rapidly spread to the diameter of an inch or more.

*Stationary Period.*—During about two weeks, sometimes longer if

unmolested, the ulcer tends to remain stationary, not undergoing any change that can be appreciated. In persons not very susceptible to the poison, the stationary period does not exist, but repair sets in after the ulcer has reached a certain size.

*Period of Repair.*—This comes on gradually. The floor of the ulcer grows more pink and even, the edges become sloping, and cicatrization advances slowly from the circumference toward the centre.

Many of the deviations in the typical features of chancroid lead to variations in its course.

*Subjective Symptoms.*—An uninflamed, uncomplicated chancroid is not painful. If, however, it be irritated by its position, or from local applications or other cause, then it becomes more or less painful, according to the amount of inflammation accompanying it. A rapidly spreading chancroid is painful, as is also a chancroid when attacked by gangrene or phagedæna.

*Situation.*—Chancroid is commonly found in the furrow behind the corona glandis on the penis of the male, and posteriorly in the fourchette of the vagina of the female. A natural pocket exists at these points, the epithelium is soft there, and abrasions are not uncommon, especially along the side of the frenum in the male. In this situation chancroid frequently ulcerates its way beneath the frenum, and sometimes perforates the urethra. The pus naturally gravitates to the fourchette in the female.

No portion of the body is exempt from inoculation by chancroid. The head and face, once considered exempt, have been proved not to be so by numerous observers.

Chancroids are common anywhere upon or within the prepuce in the male, the ostium vaginæ in the female. At the orifice of the urethra they are encountered in both sexes. Chancroid deep in the urethra of the male is very rare. The anus and rectum are the seat of chancroid either communicated *a preposterâ venere*, or, in the female, due to spontaneous auto-inoculation, the chancroidal pus trickling down over the anus from the vaginal fourchette as the patient lies upon her back. The fingers of the surgeon or of the patient may become poisoned while handling the genitals.

*Number.*—Chancroid is generally multiple among hospital and dispensary patients, often solitary in the better classes, who are more scrupulously clean. If multiple abrasions have been simultaneously poisoned during sexual intercourse, the resulting ulcers will naturally be multiple from the first. Often, however, but one sore comes out at first, and this by spontaneous auto-inoculation produces many similar sores in the immediate neighborhood. Around the anus, and at the margin of the prepuce, it is nearly always multiple. When chancroid is multiple from the first, the numerous ulcers are likely to be small. Single chancroid is generally larger.

*Duration.*—A typical ordinary chancroid untreated lasts in most individuals from four to eight weeks, according to its size. If very small, it is likely to get well sooner. The larger it grows the longer time does it require for cicatrization.

Irritated and inflamed chancroids are slow in getting well. To this class belong all those about natural orifices and where motion is apt to disturb them, the anus, the meatus urinarius, the orifice of the prepuce, and the back of a knuckle.

Extensive chancroids of the vagina and rectum in the female, and of the rectum in the male, sometimes last indefinitely. They cease in the end to be true chancroids, and their pus ceases to be auto- or hetero-inoculable. Their bases become indurated, they remain in part cicatrized, in part ulcerated, and frequently pass for tertiary syphilitic ulcerations. Differential diagnosis between them and syphilitic similar lesions and some forms of epithelial cancer is sometimes very difficult. In the vagina excision is the best treatment. These ulcers are rarely encountered except in the wards of a large hospital. They are customarily found upon the persons of old prostitutes.

The duration of chancroid is greatly influenced by phagedæna. Fournier has reported a case lasting fourteen years.

An uncomplicated chancroid occasionally relapses, often without obvious cause. It is possible for a chancroid which has almost cicatrized to break down again into ulceration and spread possibly to the same extent as before, or even farther. Such a relapse is generally due to uncleanliness, careless treatment, sexual intercourse, or abuse of stimulants.

An ordinary uncomplicated chancroid may leave no scar. Generally the scar is quite visible, especially when occurring upon the outer integument, and when once formed it is permanent, generally thin and smooth, not pigmented, its size and depth being proportionate to the original sore.

# CHAPTER II.

## CHANCROID (*Continued*).

### Diagnosis, Prognosis, and Treatment.

The differential diagnosis of chancroid lies between syphilitic chancre, herpes, balanitis with erosions, ulcerated fissures or abrasions, mucous patch, ulcerating gumma, and epithelioma.

Ulcerated herpes may be mistaken for chancroid, notably when it appears as a solitary ulcer. Herpetic vesicles are rarely solitary, and when in clusters are apt to run together. When they ulcerate they are not so deep as chancroid nor so destructive. A few days' observation should determine the diagnosis.

Balanitis with erosions is not difficult to recognize. When exulcerations are present they are not undermined and corrugated, but smooth, soft, and erythematous.

Syphilitic chancre is described fully later on. The following short diagnostic table (page 178) deals with the important broad typical characters of these lesions. For closer details of the varied features of syphilitic chancre, the reader is referred to the proper section.

An abrasion or fissure acquired during sexual intercourse or otherwise, ulcerating subsequently, is sometimes suggestive of chancroid. The lapse of a short time under the use of a cleansing lotion and dusting powder should clear up the diagnosis. The edges of such an abrasion are generally jagged, and the base of the ulcer is but little depressed and discharges a thin sero-pus. But yet such an abrasion by neglect in debilitated persons, by lack of cleanliness, by irritating treatment (partial cauterizations with nitrate of silver), may acquire in time an appearance so nearly resembling that of chancroid that a diagnosis is almost impossible. Under these circumstances auto-inoculation may be resorted to after the use of cleanliness and local applications have failed to cure. Finally, if the patient's state of mind calls for it, no harm can come by adopting the conclusion that the suspicious ulcer may be a source of poison to others, and treating it as if it were a chancroid by thorough destructive cauterization.

The diagnosis between chancroid and a secondary syphilitic ulceration situated under the prepuce sometimes gives trouble. An ulcerated mucous patch rarely exists unaccompanied by other lesions, through aid

of which its nature may be defined, as well as by its own distinctive characteristics.

| Syphilitic Chancre. | Chancroid. | Herpes. |
|---|---|---|
| *Cause.*—A specific virus... | A specific virus..... | Irritating and acrid discharges the result of uncleanliness or inflammation. |
| *Incubation.*—Constant average about three weeks. | None in reality; clinically two or three days, or longer if the virus be deposited on an unbroken surface. | None. |
| *Appearance.*—Round or oval; flat funnel-shaped, or elevated; edges adherent and not undermined; surface smooth and glistening. | Round, oval, or irregular; ulcerated excavation; edges abrupt and undermined; surface uneven and covered with yellowish membrane. | Single round vesicle or superficial ulcer; clusters of ruptured vesicles which run together and form patches of superficial ulcerations with irregularly circular borders. |
| *Secretion.*—Scant, serous... | Free and purulent..... | Slight serous or sero-purulent (if inflamed). |
| *Induration.*—Generally present; parchment-like, or cartilaginous and extensive and terminating abruptly. | Absent; sometimes simulated by inflammatory œdema. | Absent. |
| *Number.*—Single generally, sometimes multiple. | Generally multiple..... | Generally multiple but coalescent. |
| *Inoculability.*—Not auto-inoculable. | Freely auto-inoculable, reproducing a typical chancroid. | Exceptionally auto-inoculable. |
| *Course.*—Slowly progressive. | Rapidly progressive and destructive. | Slowly progressive. |
| *Duration.*—Four to six weeks, very slightly limited by local treatment. | Four to six weeks, materially limited by caustic local measures. | Variable; limited by mild local measures. |
| *Inguinal Glands.*—Multiple enlargements, separate and freely movable. Seldom suppurate. | Single enlargement, periglandular swelling, tissues boggy, skin adherent, often suppurate. | Mild glandular swellings; inflammatory adenitis exceptional. |

An ulcerated gumma is quite apt to appear under the corona glandis, near the pocket of the frenum, late in syphilis. This ulcer resembles a chancroid, and is quite likely to eat into the urethra if not arrested by treatment. Its underlying base and border are quite hard, and its history shows that it started as an induration under the mucous membrane.

Certain chancroids are hidden from view. The urethral chancroid almost invariably involves the meatus, but possibly might be out of sight. A subpreputial chancroid in case of phimosis, an anal chancroid resembling fissure—these and possibly other varieties cannot be diagnosticated in the usual way. In such case, when the suspicion of chancroid arises, the test of auto-inoculation is valuable. If auto-inoculation produces a *characteristic chancroid* (especially if the patient be not syphilitic or

cachectic), it may be reasonably predicated that the source of the inoculated pus was chancroidal.

Epithelioma should not be confounded with chancroid when carefully considered. It occurs as an exuberant new growth, in the form of a papillomatous nodule, and not at first as a destructive ulceration.

In auto-inoculation practised for purposes of diagnosis, the following facts should be remembered:

(1) A gangrenous phagedenic chancroid loses its poisonous quality, just as decomposed chancroidal pus is no longer virulent, and auto-inoculation fails.

(2) Auto-inoculation of almost any pus may take and produce an ulcer somewhat resembling chancroid.

(3) An ulcer may be a mixed chancre, in which case its auto-inoculation will take as a true chancroid; but the patient has syphilis none the less.

(4) Auto-inoculation of an irritated true syphilitic chancre may sometimes take as an ulcer resembling chancroid.

(5) A serpiginous phagedenic ulcer is auto-inoculable, but its auto-inoculation may produce a chancroid which in its turn becomes phagedenic, since phagedæna is a property of the patient and not of the chancroidal virus he secretes.

**Prognosis.**—Uncomplicated chancroid gets well in a few weeks, and never leads to a result more serious than a trifling local scar.

The fact that chancroid is not a blood disease and never produces syphilis reduces all the damage it can do its bearer to such mischief as any ulcer of similar extent and severity might equally well accomplish. In rare instances this damage is considerable. A severe and protracted chancroid of the rectum leads to stricture of that gut with all its distressing results; the mouth of the urethra may be nearly sealed up by the contracting cicatrix of a chancroid.

Phimosis by cicatricial contraction, and deformity by ulceration into the urethra, are possible results.

Erysipelas may attack a simple chancroid as well as any other lesion. The more extensive and complicated sores naturally lead to serious local consequences.

Phagedæna may stretch itself over large portions of the surface of the body, and last for years.

Sloughing phagedæna may destroy great segments of the penis, or so eat away its outer investment that the resulting scar leaves the organ practically useless. A slough has been known to open a large vessel, and serious hemorrhage as a complication thus becomes possible.

These extreme results are indeed possible, but they are so rare that they may be disregarded in giving an ordinary prognosis.

**Treatment.**—The best preventive treatment against the spread of

ulcers upon a patient by spontaneous auto-inoculation is destruction of the poison at its source, that is to say, cauterization of the chancroid, or the most absolute cleanliness if total destruction be impossible.

Chancroid owes its prolonged existence to its microbic virulence. Destroy that virulence thoroughly and the poisonous quality at once disappears, the ulcer becomes a simple sore, and the process of repair begins.

Unless a chancroid is very young, it is apt to return after being cauterized. It is possible to excise completely a chancroid, including half an inch of surrounding tissue, and even though scrupulous care has been employed, it may return at the site of the excision. Some old chancroids certainly do not get well after the most extensive cauterization. This is notoriously true of serpiginous phagedenic sores, but is not the case with recent chancroid. Such an ulcer may be cauterized thoroughly and lose entirely its chancroidal character. In an old chancroid, however, the micro-organisms have infiltrated the tissues for a certain distance beyond the base of the ulcer, and cauterization does not reach them. If the ulcerated surface is destroyed, it becomes reinfected by poison brought from beneath; and for the same reason when the prepuce is the seat of chancroid, the wound of circumcision frequently becomes poisoned, in spite of such precautions as burning the chancroid previously to the ablation of the foreskin and perfect cleanliness during and after the operation.

That the poison in ordinary cases dies out after a few weeks and is eliminated, while in other cases of advancing phagedæna it seems able to perpetuate itself almost indefinitely, is largely accounted for by unhygienic conditions, uncleanliness, and alcoholic excesses. The probability is that the difference is solely a question of the soil in which the chancroidal poison finds itself, for phagedæna is a quality of the individual and does not imply the inoculation of any special virus.

With the understanding, then, that in many old cases the chancroidal poison is widespread, and cannot be all reached by any means capable of totally destroying it, it is the opinion among authorities that total destruction of the ulcer is the proper course to adopt in all cases in which the chancroid is not of long standing. At exactly what age chancroid ceases to be curable by the destruction of its surface, and a reasonable amount of tissue beyond, cannot be stated. The rule is to cauterize a chancroid thoroughly as soon as its diagnosis is established, and to destroy all points of diagnostic auto-inoculation very promptly. Removal of the sore by curetting or complete excision is not to be advised at any period.

Potential caustics are most manageable as destructive agents, and therefore better than other means of destruction. The chloride of zinc and other pastes are less easy to control than the caustic acids and more apt to produce prolonged irritation of the surrounding tissues. Pure nitric acid is the best.

Cocaine may be used to allay pain caused by the application of the caustic acid.

The use of carbolic and nitric acid in combination is a satisfactory method. The carbolic intensifies the local effect of the cocaine and acts as an additional analgesic against the stronger acid.

To prepare a chancroid for cauterization the parts should be first properly cleansed and dried. A piece of absorbent cotton moistened with four-per-cent solution of cocaine, or a tablet triturate containing gr. ss. or gr. i. of the same, may be placed upon the surface of the ulcer and left in contact about five minutes.

Upon the ulcer so prepared a drop of pure carbolic acid is placed; any excess of acid that escapes should be absorbed with a piece of blotting-paper. After the lapse of a few seconds the surface of the ulcer is dried, preferably with a thin strip of blotting-paper. A glass rod, drawn to a point, is now dipped into fuming nitric acid, and enough acid placed upon the chancroid to fill its depression even with the surface. Any excess should be carefully soaked up with blotting-paper. This application is entirely painless. The surrounding tissues are held tense, and the action of the acid is watched. If the edges of the ulcer are undermined, the point of the glass rod should be moved around under the border beneath the surface, so that all the recesses of the sore may be equally acted upon by the acid.

As the acid cauterizes the base of the ulcer, an areola of white color is seen to grow gradually around the sore under the epithelium. When this areola gets to be as broad as the head of a pin, the cauterization should be complete. If it does not become so broad after watching it for two or three minutes, the drop of acid should be soaked out of the ulcer and a new one put in—and so on until the areola of white, dead, cauterized tissue reaches the required thickness. The sore is then dried and the subsequent dressing applied.

The eschar begins shortly to slough off, a line of healthy granulations forms around and beneath it.

A small chancroid thoroughly burned ought to be well in ten days; more extensive sores require more time.

The after-treatment of the cauterized surface should consist of the application of a moist dressing, for which purpose corrosive sublimate solution, 1 : 4,000, may be employed, keeping the parts thoroughly cleansed and the opposing surfaces of the prepuce separated by the interposition of a piece of cotton or lint moistened with the same solution, or with 1 : 50 carbolic acid. A dry dressing may be substituted for the wet in the form of a dusting-powder, such as iodoform or one of its substitutes. The smell of iodoform is a serious objection and cannot be satisfactorily disguised. Nosophen is an iodine preparation of strong antiseptic action, which has proved of value. Eudoxin is a bismuth salt

of nosophen and possesses mild astringent and absorbent properties. Other antiseptic powders have also been used, such as aristol, europhen, acetanilid, and iodol.

It is unwise to cauterize a chancroid unless each and every abrasion in the neighborhood, and all suppurating spots, can be totally and simultaneously destroyed. For if any chancroidal ulceration remains it is sure to poison the healthy ulcer left by the separation of the slough, and to reconvert it into a chancroid. Thus, chancroid at the margin of the prepuce cannot be cauterized if subpreputial chancroid also exists and is spared.

In case of numerous subpreputial chancroids, if the foreskin be naturally tight the reaction following cauterization may inflame the prepuce sufficiently to cause phimosis and prevent retraction of the foreskin. A fear of this occurrence need not deter the surgeon from a use of the acid. The cavity of the prepuce can be kept syringed out, and if the cauterization has been effective the chancroids will certainly get well, even within an inflamed prepuce.

When all the chancroids cannot be reached, or are so large and old that cauterization is not advisable, cleanliness is the first requisite of treatment. Frequent washings with sublimate solution 1:2,000 or carbolic 1:40 are to be recommended. The surfaces should then be treated either with a moist or dry dressing, which should be changed frequently. Unquestionably an efficient local application for such chancroids is iodoform, in powder or mixed into an ointment with vaseline. But respectable people will not use iodoform. Its peculiarly penetrating and tenacious odor is unmistakable. Nothing will disguise the odor satisfactorily, although many expedients have been employed for that purpose. Solutions of iodoform in ether have been recommended. Their application is painful, the solvent evaporates, and the odor exhales as strongly from the fine dust left precipitated over the surface of the ulcer as if it had been at first deposited there in its natural state.

The effect of iodoform upon chancroids is often striking. It freshens up the surface and hastens granulation, at which stage it should be discontinued.

Nosophen also may be employed as a dressing to the chancroids which are not treated by cauterization in the same manner as iodoform, after the surface has been thoroughly cleansed and dried. This preparation has met with decided favor. It contains a large percentage of iodine and is inodorous.

Glutol or formalin gelatin is an odorless powder which owes its antiseptic properties to the fact that when decomposed in contact with a wound surface it liberates formaldehyde vapor. Satisfactory results are reported from its use in the treatment of chancroid, more particularly when all sloughing tissue has been removed and when it is desired to assist cicatrization.

For the relief of the pain, which sometimes is very acute with inflamed chancroids, powdered orthoform may be applied at odd intervals between the other applications, and generally with marked effect.

When the stage of activity of chancroid has passed and the process of repair seems to be going on satisfactorily, it is only necessary to apply a dry impalpable absorbent powder to allay irritation and prevent friction. For this purpose may be used equal parts of bismuth, starch, and oxide of zinc, or bismuth and lycopodium. If the ulcers prove sluggish and slow to cicatrize in the reparative stage, the application of a solution of nitrate of silver, gr. x.–xx. to the ounce, or of the powdered citrate of silver (Credé), may hasten their progress toward recovery, or a little calomel and bismuth, 1:10. Besides these there are many soothing and gently stimulating applications.

If the sores are subpreputial and the prepuce is loose, it is well always to pull back the foreskin whatever dressing is employed, and to interpose a small piece of gauze or absorbent cotton, in such position that it will lie between the sores and the healthy tissues, when the foreskin has been replaced.

When the discharge of pus is considerable, moist dressings are preferable, and lint slightly moistened with the fluid selected should be kept constantly applied to the surface of the ulcer. One of the following lotions will serve:

℞ Hydrargyri bichlor., . . . . . gr. ss.-ij.
Aquæ, . . . . . ℥ iv.
M.

℞ Acid. carbolic., . . . . . ʒ ij.
Spts. rect., . . . . . ʒ iij.
Aquæ, . . . . . ℥ iv.
M.

℞ Zinc. sulphocarbolatis, . . . . . gr. vi.
Spts. rect., . . . . . ʒ ij.
Aquæ, . . . . . ℥ iv.
M.

℞ Solut argenti lactas (Credé), . . . . . 1 2,000

With such moist or dry applications and patience, uncomplicated chancroids get well within a reasonable period.

Internal medication is of no value in ordinary cases. If the patient be manifestly debilitated, he should receive tonics and good food, and all functional derangements demand appropriate attention, but there is no internal specific for chancroid. Rest of body is sometimes desirable.

*Subpreputial chancroid* implies a chancroid concealed by the prepuce, either congenitally tight so that it cannot be retracted, or in a state of temporary phimosis from inflammation. The latter condition will be discussed under the head of Complications.

When a chancroid is inside of a congenitally contracted foreskin, its presence can sometimes only be surmised. Generally a lump, tender on pressure, may be detected at one spot, however, or there may be several of them; and the auto-inoculability of the pus, and the possible existence of chancroids at the margin of the prepuce, help to make the diagnosis.

In treating such chancroids, if the prepuce *be not inflamed and in danger of strangulation*, it is not necessary to use the knife. No extensive destruction of the parts within the prepuce is apt to occur unaccompanied by such external evidences of destructive inflammation as will naturally call for heroic interference.

Cleanliness is more necessary in treating these chancroids than any others. A syringe with a long, flattened nozzle (Fig. 11, p. 36) should be used, its point inserted well down to the sulcus behind the corona, and into the pockets on either side of the frenum. Warm injections, one of the lotions given on p. 183, should be made frequently enough to keep the pus from accumulating. Iodoform shaken up with balsam of Peru may be injected into the depths of the preputial cavity with the preputial syringe. Generally, these chancroids are slow, and cleanliness, with time, are the important elements in the cure.

*Chancroids of the margin of the prepuce*, there being no ulcers within, if they can be thoroughly exposed, should be cauterized.

Chancroids undermining the frenum, perforating through from one side to the other, call for a division of the frenum, to hasten their cure and avert the possibility of bleeding, should the frenum become accidentally ruptured or eaten through by ulceration. This is best accomplished by tying a stout silken ligature around it, and cutting the ligature short. The ligature cuts its own way through very promptly, and then the open chancroid may be treated more satisfactorily. If chancroid in this region is not controlled it may give great annoyance, its destructive action extending into the median fossa of the glans, or perhaps perforating the urethra, producing urinary fistula.

Chancroids at the margin of the meatus urinarius may be cauterized unless they run too far down into the urethra. In the latter case iodoform plugs (a roll of lint covered with cerate and sprinkled with iodoform) will hasten recovery. Urethral chancroids lower down than the fossa navicularis are excessively rare and some of the cases reported are errors of diagnosis.

*Anal and rectal chancroids* are always obstinate and difficult to manage. The daily stretching of the parts by the fæces and the difficulty of maintaining perfect cleanliness are the main obstacles to recovery.

Cauterization is inappropriate for ulcers in this region. Frequent washings with warm water containing corrosive sublimate, and confinement to bed, with lavish use of iodoform powder upon all the ulcerated surfaces, is the best treatment for recent chancroids in these regions.

Constipation must be prevented. When the chancroid has lasted for years, and produced stricture of the rectum, extirpation with the knife or linear resection may be required.

*Chancroid of the Fingers.*—When the surgeon or accoucheur gets chancroid upon the finger, it should be thoroughly cauterized, and dressed with one of the moist or dry applications given above. The finger should be kept immovable upon a splint. A chancroid on a knuckle is sometimes as hard to cure as a chancroid of the anus or at the meatus urinarius, the reason being that the incessant injury done by motion of the part keeps the ulcer alive. An ordinary abrasion will sometimes ulcerate and last for weeks upon a knuckle, and be mistaken for a more serious condition.

# CHAPTER III.

## THE COMPLICATIONS OF CHANCROID.

An ulcer doubtless cannot exist without some **inflammation,** but a typical chancroid is attended by very little. Most chancroids, however, as encountered clinically, are inflamed in a measure, and possess all the qualities of inflammation to a greater or less extent. This amount of inflammation does not constitute a complication.

When a chancroid inflames from mechanical or chemical irritation, or on account of the neglect of the patient, its base hardens, its discharge grows thinner and sanious, pain is complained of, and generally the course of the sore is prolonged, the surrounding tissues becoming œdematous and indurated, and the ulcer finally pale, flabby, unhealthy, going on to a slow cicatrization. Simple bubo is very much more apt to occur with an inflamed chancroid than with a typical ulcer.

When inflammation complicates subpreputial chancroid, the tissues of the prepuce become much engorged, and sometimes very hard and rigid from stiffening of the connective tissue by inflammatory exudation. A superficial *lymphangitis* is the cause of these phenomena; the larger lymphatic vessels may escape entirely. This lymphangitis is not an uncommon complication of chancroid.

Inflammatory *phimosis* or *paraphimosis*, under these circumstances, often ensue. If the chancroid occupies the inner surface of the prepuce, the latter is in danger of strangulation and may undergo total gangrene, a large portion of the prepuce, with the chancroid, sloughing away and allowing the glans penis to protrude through the opening, making a sort of double-headed penis. The remains of the prepuce in such cases continue thickened and indurated, and require to be trimmed away finally, when cicatrization is complete.

A more disastrous result of inflammatory phimosis is the possibility of many new points of auto-inoculation within the cavity of the prepuce, the retained poisonous pus excoriating the surface of the glans penis and perhaps inoculating the meatus. Portions of the new chancroids may then slough, and considerable loss of the glans penis ensue, with stricture of the meatus from cicatrization. The liability of causing bubo by allowing an inflamed prepuce over a chancroid to remain long unrelieved is to be borne in mind, and the possibility of extensive denudation of the penis by the backward burrowing of the retained chancroidal pus has been clinically proved (Vidal).

Inflammatory paraphimosis may complicate a chancroid when the prepuce is short. The swelling encircling the penis may become so great that the circulation of that portion of the penis lying in front of the constriction is menaced.

The **treatment** of the inflammatory complications of chancroid is obvious. Rest must be insisted upon, the penis elevated and covered with moist, cooling, evaporating lotions, or with astringent solutions. One of the following should be kept constantly applied cold upon a thin cloth on the outside of the penis:

| | | |
|---|---|---|
| ℞ Glycerini, | . . . . . | ♏ xx. |
| Spts. rect., | . . . . . | ʒ i.–ij. |
| Liquor. plumbi subacetat. dil., | . . . . q.s. ad | ℥ i. |

M.

Or—

*Aluminum Acetate Solution.*

| | | |
|---|---|---|
| ℞ Aluminis, | . . . . . | gr. xxx. |
| Plumbi acetat., | . . . . . | ʒ iiss. |
| Aquæ, | . . . . . | ℥ vi. |

M. Filter.

These applications are palliative. The treatment of the chancroid meantime goes on by subpreputial injections, iodoform applications, or whatsoever it may be. If the subpreputial discharge of pus gains in quantity, if the inflammation fails to yield and gangrene is to be feared, then but one course is left, namely, to slit open the cavity of the prepuce and dress with iodoform or nosophen; or, better still, antinosine, which is the sodium salt of nosophen, and especially lauded for sluggish ulcerations. This last application is generally employed in a five- to eight-per-cent solution with glycerin or water. Cauterization in these cases will not prevent the wound from becoming inoculated and only prolongs the duration of the sore.

In cases of paraphimosis the line of stricture of the prepuce must be divided with the knife as soon as the circulation of the penis in front of it is threatened. If the circulation continues perfect it is better in most cases not to attempt to reduce the paraphimosis, since the latter insures the advantage of leaving the ulcers exposed to view.

**Phagedenic Chancroid.**—This is the most formidable of all the local complications. Phagedæna occurs in two forms: sloughing or gangrenous phagedæna and serpiginous. The predisposing general causes of phagedæna are not uniform. It sometimes attacks a florid, healthy-looking youth, and often spares a cadaverous consumptive or a patient debilitated by excesses of all sorts. It is a rare complication. Phagedæna is not confined to chancroids. Any ulcer—syphilitic or simple—may be attacked by it. It is a peculiar quality of the individual. The pus from a phagedenic ulcer will not produce phagedæna by hetero-inoculation.

This has been abundantly proved by Fournier, Sperino, Rollet, and others. Conversely, it is known that a simple chancroid produced upon a patient with phagedæna is liable also to become phagedenic, showing clearly that the phagedenic quality is a personal one.

Among the presumed predisposing causes of phagedæna have been grouped all depressing dietetic, hygienic, diathetic, and pathological conditions—old age, misery, alcoholism, scrofula, malaria, digestive troubles—but not one of these causes can be proved sufficient in the majority of cases. As local causes, lack of cleanliness, neglect of treatment, and improper treatment, have been accredited with a fair share of the blame in its production. It is probable that phagedæna is a personal idiosyncrasy, not existing continuously in a given patient, and aggravated by those causes which have generally been considered capable of generating it.

When a chancroid is attacked by **gangrenous** phagedæna the tissues beneath it swell up and become livid for a distance around. The pus gets scanty and sanious. The ulcer grows larger and dryer; a slough, gray, brown, black, promptly forms upon it; the part becomes excessively painful; the slough separates promptly or slowly, according to its thickness; and then comes a lull in the process.

After a rest of longer or shorter duration a new attack of pain announces the commencing formation of a new slough, and the process repeats itself. Large excavations in the tissues are thus caused, for sloughing phagedæna spares nothing. It does not dissect out the vessels or arrest itself at a barrier formed by a new tissue. It may sweep away the penis in the male, destroy the labia and perineum in the female, make the most extensive ravages before its fury is appeased. It may even endanger life by exciting peritonitis when ulcerating deeply over the abdomen, or by giving rise to profuse hemorrhage by cutting through a blood-vessel. It may wear out the sufferer by pain, and all the symptoms of general septicæmia, fever, exhausting diarrhœa, and debilitating sweats.

The poisonous chancroidal quality of these ulcers remains, as has been tested by inoculation; yet a part of the poisoned surface seems to grow tolerant of the virus after a time.

**Serpiginous** phagedæna is milder in all respects than the sloughing variety, but is more chronic. The former exhausts itself, yields to treatment, or kills the patient within a reasonable period, while creeping phagedæna seems to have little or no reaction upon the general health, is not attended by much pain or any fever, and yet continues sometimes almost indefinitely. A phagedenic chancroid of fourteen years' duration was reported by Fournier.

Serpiginous phagedæna commences as a swelling at the borders of the chancroid, which appear more red than usual, and as the connective tissue

is destroyed by gangrene, the borders of the ulcer become largely undermined. The remaining bridges and their flaps of livid skin, perforated here and there where the ulcerative action has eaten through to the surface, make pockets and sinuses around the ulcer, some of which extend long distances. In this manner all the integument of the penis may be dissected up, large pouches run down the thigh and around the crest of the ilium, or (more rarely) up over the abdomen.

As one side of the ulcer advances the other generally heals, and thus the ulcer creeps for months, perhaps for years, over the surface. The base of the sore retains its chancroidal appearance. It is uneven, gray, covered with adherent, pultaceous secretions, and occasional prominent, flabby granulations bleeding at the slightest touch. The discharge is watery, bloody, usally free, occasionally scanty.

Periods of rest of greater or less length occur during the progress of phagedæna, when the ulcer remains stationary, or even, perhaps, seems to be healing all around; and then, without apparent cause, the phagedenic action will commence again at one border, while cicatrization goes slowly on undisturbed at the other. Phagedæna once seen cannot afterward be confounded with anything else.

The bubo attending phagedenic chancroid may be a simple one or may be virulent, and itself take on phagedenic action. Phagedæna seldom attacks simple inflammatory bubo.

**Treatment.**—All possible improvement in the hygienic surroundings of a patient, a generous and varied diet, and internal tonic measures are of value in treating phagedæna. Cod-liver oil, if it can be digested, quinine in large doses, especially in the depressing fever of sloughing phagedæna, and iron, are suitable remedies. Custom has sanctioned the preference for Ricord's tartrate of iron and potassium, in gr. x.–xx. doses in solution, as a tonic. Ricord thought it was nearly a specific, and some cases certainly do well upon it. The pain if great is to be relieved by opium.

The local treatment is more important than the general, and both forms of phagedæna require the same local measures. Total destruction of all the tissues involved, and extending widely beyond the immediate area of disease, is certainly the best treatment. This cauterization must be a severe one. It will not destroy more tissue than the ulcer left to itself would have eaten away, and an imperfect cauterization will do more harm than good.

The ulcer must first be made ready for cauterization. Anæsthesia may be obtained by infiltrating the surrounding tissues with cocaine (four per cent) or eucaine. All overhanging bridges and flaps of undermined livid integument must be cut away. It is best to do this with scissors, and to sear the bleeding edges at once with a Paquelin cautery. When all sinuses have been laid open, and the whole ulcer is flat and exposed and the bleeding arrested, then the surface should be washed with a solu-

tion of corrosive sublimate 1 : 2,000, or two-per-cent solution of carbolic acid, and dried with blotting-paper. Next, it should be touched all over with pure carbolic acid and dried.

Nitric acid cannot be depended upon for final cauterization. A certain depth beneath the ulcer must be destroyed in all directions, in order that it may prove effective. A liquid caustic cannot be applied uniformly over the whole surface; it will spare the elevations, and spend its force upon the depressions. On this account other caustics are better.

The choice lies between the actual cautery and a caustic paste. The galvano-cautery or Paquelin cautery may be used and should be employed with the utmost deliberation and care, so that the entire base and surrounding integument for one-fourth of an inch is absolutely charred, and thus a cure of the phagedæna may be confidently expected.

Unfortunately, but few phagedenic sores are sufficiently small, or so situated as to be certainly totally destroyed in this manner without endangering surrounding parts. In such case, if the ulcer is suitable for cauterization at all, a caustic paste should be employed. Either the chloride of zinc or the carbo-sulphuric paste may be used—preferably the former, freshly made, by mixing equal parts of chloride of zinc and dried flour with a few drops of alcohol to the consistency of a paste. This is to be packed and crowded into all the uneven crevices and irregularities of the surface already prepared, as directed above, and thoroughly dried out. The packing is done with a small wooden spatula, and the excavation of the ulcer filled in even with the surface of the surrounding integument at the edges, but not laid on thicker at any one spot than one-eighth of an inch, since this thickness is ample. The packing is covered with a piece of absorbent gauze or lint cut to fit, the surrounding epidermis is greased with vaseline freely, then the whole surface is generously dusted with powdered starch or lycopodium, covered with a thick layer of absorbent cotton, the whole retained by a snug roller bandage.

Morphine may be required to control pain. The bandages should be removed in from twelve to twenty-four hours, the surface washed and dried with absorbent cotton, and finally dressed with a mildly carbolized wet dressing, or any other simple application.

Bromine solution, 1 : 3, has been suggested for these ulcers, and a saturated solution of antinosine—the sodium salt of nosophen—but neither of these means has been generally enough employed to justify a conclusion as to its exact value. The methods above detailed are certainly efficient when cauterization is justifiable.

There are many cases of bad phagedæna in which cauterization should not be attempted. In any case, when the whole surface cannot be laid bare and included in one cauterization, other means must be used. This exception covers many cases of vaginal and rectal phagedæna—cases in which extensive layers of integument have been dissected up, and cases

in which long sinuses exist involving too extensive destruction of tissue. Cauterization is not applicable when there is danger that the caustic may do harm by eating in too deeply, as over the sheath of the femoral vessels. Finally, if thorough cauterization has once failed, it is better to try other means before resorting to it again, and under these circumstances the occasional application of the lighter caustics, pure carbolic acid, or bromine 1:3 in glycerin, may freshen up the surface and help to cure in many cases in which thorough cauterization cannot be applied or has failed.

When cauterization is not desirable, powdered iodoform was formerly considered the best local application; antinosine, in powder form or a saturated solution as a wet dressing, is also to be recommended. The powder or solution should be freely applied to the ulcer and should be renewed as often as the discharge collects, which, together with disinfecting washes of carbolic acid or weak chlorinated soda water, is an excellent resource, and often acts favorably.

The method of treating phagedenic, syphilitic, and other unhealthy sores, by intermittent or continuous submersion in water, has been followed by some exceptionally good results.

The names of Hebra in Germany, Hutchinson in England, and Hemard in France are well known in connection with this treatment. We have seen the most salutary results from this method in very unpromising cases. The reliable results which have been published certainly render it worthy of trial in severe cases of phagedæna, whether attacking chancroid, chancroidal bubo, or a syphilitic sore.

The method of submersion as employed by Mr. Cooper[1] is simple and easy to carry out, while its effectiveness can hardly be doubted after reading the report of cases in which it was used.

The patient is made to sit in a hip-bath, or other convenient bath, so that the site of the ulcer may be entirely submerged for from eight to ten hours a day. The water is kept as nearly as possible at a uniform temperature of 98° F. Here the patient quietly remains all day. In the evening finely powered iodoform or other suitable dressing is put upon the sore.

On the following morning the patient enters his bath without disturbing the dressing of his local ulcer. The water of the bath thoroughly soaks these dressings and removes them without pain.

A purge before the course of baths, tonics, and any other appropriate internal medication during their use, are recommended.

Some excellent cases are detailed, showing the rapidly favorable influence of the submersion in from two to thirteen days.

The application of hot water at as high temperature as can be toler-

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[1] London Lancet, May 24th, 1879, p. 731.

ated has also been employed as a therapeutic agent in the treatment of chancroid, and it is claimed with excellent results.

Chancroid is not said to be complicated by syphilis when a patient with syphilis gets chancroid. The term is applied only to the "mixed chancre," when both poisons exist at one and the same time in the local sore (p. 212). The previous existence of syphilis in a patient does not at all modify the appearance or course of chancroid.

### Lymphangitis and Bubo.

**Lymphangitis.**—Chancroidal lymphangitis is not a frequent complication. The lymphatic trunks rarely become implicated without simultaneous bubo, while bubo frequently occurs when there is no lymphangitis.

Lymphangitis attending chancroid is of two varieties: inflammatory and virulent.

Inflammatory lymphangitis attacks one or more of the lymphatic trunks upon the back or sides of the penis which become thickened, mainly by inflammation of the connective tissue surrounding the vessel. A hard cord is felt under the skin, with perhaps several knotty swellings along its course, usually sensitive to pressure, sometimes adherent to the skin, varying in size from a goose-quill to a broad band, according to the extent of the surrounding inflammation, sometimes marked upon the surface by a red line. This hard cord may extend from the chancroid a certain distance, or may be traced to the root of the penis. Sometimes it is found only toward the root of the penis, being absent in front. If the superficial lymphatics are also involved, the skin may become œdematous, hot, and painful. If the inflammatory symptoms run high, there is a corresponding amount of general reaction in the way of fever, etc.

The terminations of inflammatory lymphangitis are by resolution and suppuration. The pus in the latter case is always simple, non-virulent, and is due to excess of inflammatory action. The abscess generally heals promptly, and the lymphangitis always gets well.

Virulent lymphangitis is very rare. It possesses all the foregoing symptoms in a high degree, and goes on promptly and necessarily to suppuration at one or more of the knotty points along the inflamed cord. The pus discharged is auto-inoculable and yields chancroid. The abscesses at the suppurating points do not heal, but become chancroids, and require to be treated as chancroids.

**Treatment.**—Mild cases require no special care. If pain and surface redness run high, a cool astringent or evaporating lotion is appropriate. The aluminum acetate mixture (see p. 187) is a favorite application, to be used in the form of a wet dressing. The patient should remain in bed with the penis elevated, and not hanging down between the thighs. Poultices are objectionable, since they soften the epidermis and tend to

increase the size of the resulting chancroid, should suppuration ensue and prove virulent. Abscesses should be opened promptly, and the dressing frequently changed. They get well shortly under wet or dry antiseptic dressing if the suppuration be simple; if virulent they are chancroids, and must be treated as such.

**Bubo.**—The term "bubo," although generally confined to inflammatory enlargement of the inguinal or crural glands, may be correctly applied to a similar condition in any lymphatic gland in connection with a venereal ulcer.

Taking the statistics of various writers, the frequency of bubo as a complication of chancroid is between nineteen and thirty-three per cent. The inflammation is confined to the ganglia of the superficial chain; the glands nearest the ulcer lying below Poupart's ligament, above the saphenous opening, are most often involved.

Bubo usually occurs in the groin corresponding to the side of the penis involved by the chancroid—but it may be in the opposite groin; or double bubo may occur with a single sore, when the latter is located in the region of the frenum.

*Cause.*—It is generally held that neglect of treatment and uncleanliness are exciting causes in the production of bubo. The irritation attendant upon balano-posthitis with phimosis, specific and non-specific urethritis may be sufficient to produce inflammatory enlargement of the inguinal or crural glands of a mild degree, the latter conditions as well as ulcerated herpes and severe balano-posthitis may be productive of irritations of such an intense character as to result in suppurative bubo, especially in those of debilitated condition and lymphatic habit. Ducrey claims that the streptobacillus which bears his name is found in the pus of chancroidal bubo, and in this contention he is sustained by those workers who confirm his views regarding the specific character of this organism. Among these are Welander,[1] Krefting,[2] and Unna.[3]

Deutsch[4] found the Krefting-Ducrey bacillus in the pus of three cases of bubo, inoculations from which produced typical chancroid. In thirty-four cases of bubo examined by him in which the bacillus was not found inoculation was not successful.

In many cases of bubo the ordinary pus organisms are demonstrated, and in some cases the pus is found to be free from pyogenic microbes. Many authors maintain that the ordinary pus organisms and not a specific microbe are the direct cause of buboes; others that they are due to the poison generated by pyogenic micro-organisms. In view of the bacteriological observations made by Deutsch and others it is likely that the con-

[1] Archiv für Dermatol. und Syph., 1892.

[2] Ibid.

[3] Monatschrift für prakt. Dermatol., 1892, vol. xiv. *et al.*

[4] Centralblatt für die Krank der Harn- und Sexual-Org., 1897, pp. 354 and 424

clusions of all of these authors are more or less correct, and that some buboes are caused by the presence of ordinary pus organisms, others by the absorption of the chemical products or toxins of these bacteria, while a few are due to the presence of the specific organism of chancroidal virus resulting in the production of the so-called *virulent bubo.* It is again claimed by some that this last form is not due to the propagation of the chancroidal virus through the lymphatics, but that inoculation takes place after the bubo has been opened. While this may be the case in some or even a majority of instances, it certainly is not invariably true.

There are two distinct types of bubo—*simple* and *virulent.* A simple bubo is that form which occurs in connection with the irritation propagated along the lymphatic radicals in connection with balanitis, herpes, gonorrhœa, an irritated syphilitic chancre or chancroid. A sore of any kind may give rise to it in a subject who is predisposed by being run down physically. Chancroid is the most common cause.

A virulent bubo may arise from a simple inflammation or phagedenic chancroid, and is so called because it takes on the character of chancroidal ulceration; and assuming its cause to be the specific organism of this venereal sore, it must be derived either by propagation through the lymphatic channels or by inoculation after the bubo has been opened.

*Simple bubo* generally occurs early, if at all (in connection with chancroid), commencing within a week or two after the sore is fairly under way; yet it may occur when the ulcer has nearly run its course. The immediate determining causes are often fatigue, excess, mechanical injury to the gland; but chancroid alone may cause it without the assistance of any of these additional provocations.

Generally only one gland is affected, or one gland so much more prominently than the others that the latter may be disregarded.

The **symptoms** of simple inflammation of a lymphatic gland are at first a sense of stiffness in the groin and a slight swelling of a single gland. The gland rolls under the skin, is sensitive to pressure, and the seat of pain upon standing, walking, and particularly upon going upstairs. As the gland increases in size, the pain proportionately increases. The skin finally adheres and becomes reddened; then it becomes œdematous, and a central soft spot appears, indicating suppuration. Occasionally the periglandular tissue suppurates, the gland itself undergoing resolution. Left to itself, the abscess opens, discharges for a varying period, according to the general health of the patient and the condition of the sore. Much exercise always interferes with rapid repair. Occasionally the pus burrows in various directions beneath the skin.

This is the typical inflammatory bubo, whether it occurs during the course of chancroid, urethritis, etc., or is of idiopathic origin. Its course may be arrested spontaneously, or by treatment at any period, even after suppuration has been established. The amount of fever or general sys-

temic disturbance is considerable in some cases, absent in others. Suppuration may be announced by chill. Finally, simple bubo may be complicated by gangrene or erysipelas.

Another form of bubo, which is known as indolent or strumous bubo, occurs generally in those suffering from malnutrition or a debilitated constitution. This bubo is often double, a number of lymphatic glands being involved on each side. The tumor may reach the size of an egg or a small orange, be attended by but little pain, and perhaps no appreciable systemic disturbance. The adherent integument over the lump is thin, livid, sometimes shining, usually of a dead hue, sometimes smooth, sometimes irregular, œdematous, and undermined.

This livid, chronic enlargement in the groin may continue for weeks, possibly for months unchanged, occasioning very little annoyance. Sometimes, on the other hand, it is attended by considerable pain. A chancroid may have healed up long before any change has occurred in the buboes—sometimes even before they have reached their full development.

The pus may burrow in different directions slowly under the skin, and at the bottom of long sinuses other little livid abscesses may form and open spontaneously, leaving rigid fistulæ to discharge indefinitely.

A spontaneous or simple bubo arising from a strain, fatigue, or local injury in a strumous or cachectic person has nothing to do with syphilis and no connection with chancroid, and does not imply either of the latter diseases any more than does a suppurating gland in the neck. Much was formerly written of this *bubon d'emblée*. Its claims to recognition as a venereal malady have been entirely overthrown, and its accidental position in the groin alone gives it interest and prominence, more than attaches to the same identical lesion when it occurs spontaneously in the axilla.

*Virulent bubo* may arise from a simple, from inflamed, or from a phagedenic chancroid. There is no certain date of its appearance. It may commence very late. Occasionally it declares itself just as the simple chancroid from which it arises is getting well. Sometimes double bubo exists with a single chancroid—on one side a simple bubo, on the other a virulent.

The first features of virulent bubo are those of simple suppurating adenitis accentuated. When the abscess ruptures or is opened with the knife its true chancroidal character begins to appear. The opening becomes larger by the slowly advancing ulceration. The borders get hard, livid, undermined, while the integument surrounding the edges assumes a dusky purple hue, perhaps is perforated in a new spot, or sloughs away in pieces. The bottom of the abscess, now an ulcer, becomes irregular, worm-eaten, covered with a pultaceous, adherent deposit, discharging plentifully a purulent secretion, which is inoculable upon the bearer.

This ulcer, with its ragged, abrupt, ulcerated, and undermined edges,

its uneven, pultaceous floor, and auto-inoculable discharge, is a true chancroid. The pus may burrow along the groin, down the thigh, or upon the abdomen.

Phagedæna, either in the sloughing or in the serpiginous form, may attack a chancroidal bubo. The latter is more common, and usually the origin of those extensive chancroids which last for so many years.

A phagedenic bubo may have originated from a non-phagedenic chancroid, just as a phagedenic chancroid of the penis may have a simple bubo or no bubo at all.

*Treatment.*—Simple bubo sometimes may be aborted. The moment a trifling stiffness in the groin begins to be felt, and a single gland is found, by pressure, to be the sensitive spot, the greatest amount of rest possible should be insisted upon. The diet should be moderated in conformity to the rest enjoined. Stimulants should be avoided. A laxative may be required. The chancroid should be cauterized at once, if it be a sore suitable for that treatment.

Iodine does not seem to possess any value in aborting simple bubo, and most ointments which have to be rubbed in with the fingers lead to as much harm by mechanical irritation as they do good by virtue of the medicament they contain. Belladonna ointment in conjunction with the application of a snug spica bandage is said to yield good results in some cases.

Cold applications are useless. The hypodermic injection of carbolic-acid solutions, from gr. viii.–x. to the ounce, and of one-per-cent solution of benzoate of mercury have been advocated, the former by M. K. Taylor,[1] the latter by Welander,[2] who report successful results by the use of these interstitial injections. These methods lack general indorsement.

When abortive measures have proven unsuccessful or when abscess of the gland forms promptly, in spite of efforts to arrest it, flaxseed poultices may be employed to encourage suppuration. At this stage drainage is obtained by simple incision, or total extirpation of the hyperplastic glandular structures is effected by curetting.

After evacuation of the abscess the resulting cavity is treated as an ordinary suppurating wound with antiseptic lotions, such as corrosive sublimate 1 : 2,000, or carbolic acid 1 : 50, being dressed daily, carefully packed with absorbent gauze, and granulation encouraged by the aid of balsam of Peru or other stimulating applications. A five-per-cent mixture of the balsam and castor oil is useful here, as it is in other granulating wounds.

Hadyen[3] advocates the use of ten-per-cent iodoform ointment in the

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[1] American Journal of the Medical Sciences, April, 1882.

[2] Archiv für Dermatol. und Syph., 1892.

[3] Chicago Medical Journal and Examiner, September, 1886.

abscess cavity after it has been irrigated and cleansed with peroxide of hydrogen and bichloride of mercury. His report of cases gives an average duration of eighteen days.

Another method, advocated by Howland, of Washington, substitutes for iodoform vaseline the preparation known as glutol-Schleich or formalin gelatin. This author packs the abscess cavity with the above preparation, which is left *in situ* without redressing for six days. He reports an average duration of eleven days, the shortest being six and the longest eighteen days.

Complete extirpation of buboes has been advocated by several writers. Howland[1] adopted this method in four cases in which it required from two to twenty-eight days to effect a cure. It is obvious that in most cases of *simple* bubo this method has nothing to recommend it in preference to other less radical procedures. This does not apply, however, to the treatment of the indolent or strumous bubo. In such cases much valuable time may be gained to the patient, together with improvement in the general health, by complete extirpation of the diseased glands. A general anæsthetic should be administered, all pockets and sinuses laid freely open, and the diseased and infiltrated tissues dissected out or scraped with a sharp curette. All the exposed glands, whether they be apparently healthy or not, should be removed, which may necessitate careful dissection, sometimes as deep as the sheath of the femoral vessels or even between them. The hemorrhage is sometimes quite profuse, but is readily arrested by the application of ligatures and subsequent packing of the wound. The after-treatment of the resultant cavity is the same as that following the incision of simple bubo. The local treatment of the indolent form of bubo should be supplemented by proper internal remedies in the form of tonics, a generous diet, and cod-liver oil.

The treatment of virulent bubo is that suitable for a large chancroid. Surgical cleanliness is of the first importance. Cauterization is generally not desirable. The entire surface and abscess cavity should be copiously irrigated with strong antiseptic solutions. Any undermining of the borders or tendency to burrow should be met with a prompt incision to the bottom of the pouch. The cut edges may become ulcerated and the chancroid enlarged, but this is preferable to the formation of a sinus. The bottom of the ulcer should be more thoroughly cleansed by curetting and removal of all dead tissues and sloughing detritus. Having exposed the entire surface to the free access of local remedies, subsequent treatment and management are the same as for ordinary chancroid.

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[1] "The Cause and Treatment of Bubo," Medical News, November 26th, 1898.

# CHAPTER IV.

## SYPHILIS.

### Definition—Origin—Course—General Pathology.

**Definition.**—Syphilis is a specific constitutional disease, acquired either by inheritance or by contagion—generally but not always during sexual intercourse. It is characterized by the appearance of a primary lesion at the seat of inoculation, followed by periods of eruption, varying in nature, severity, and duration. The earlier symptoms are superficial, the latest involve the deeper structures. No organ in the body is exempt; the connective tissue is most constantly affected, at first in the form of a low chronic inflammation, and later as the seat of small morbid growths known as gummata. Treatment may shorten and modify the disease; time alone can wear it out. A perfect recovery is possible.

The origin of syphilis is involved in impenetrable darkness. It has been the subject of learned essays and volumes. Dr. Buret in a literary exposition[1] upon the subject affirms that it was known among the Chinese two thousand years before Christ, and many believe that it has existed in all countries ever since; that it was known to physicians of ancient days and during the Middle Ages, although its nature was not then fully recognized. Other investigators aver as emphatically in learned writings, equally founded upon fact, that the disease was brought from America upon the ships of Columbus, and from this origin spread like a plague through all Europe.

It is not within the scope of this work, which proposes to deal with practical questions, to enter into an analysis of the various views expressed regarding the primeval origin of syphilis.

It is well, however, to know that it was not recognized as a morbid entity until the end of the fifteenth century, at and after the period of the siege of Naples (1494–95) by Charles VIII.; that then, and for a considerable time thereafter, the disease behaved with unwonted virulence, attacking all classes of society, and killing a large number of its victims. From that time to the present day syphilis has been a subject of peculiar interest to all classes of medical men. It enters the domain of every branch of pathology.

Whatever and wherever was the first origin of syphilis matters little;

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[1] "La Syphilis aujourd'hui et chez les Anciens," Paris, 1890.

now it is everywhere, and probably spreading. All countries on the globe possess it.

In certain parts of the world syphilis is said to be exceptionally mild, as in Portugal. This has been ascribed to the fact that the population are saturated with syphilis, and owe their immunity to their syphilitic forefathers. In certain countries, on the other hand, syphilis is said to be exceptionally malignant—South Sea Islands, Mexico. The acquisition of syphilis by one race of people from another is believed to produce a severe type of disease. It is well known that sailors habitually have the disease severely, and they acquire it doubtless often in foreign ports.

A natural deduction from these facts is, that finally syphilis will become uniformly acclimated all over the world; that it will diminish in severity as it increases in extent, and perhaps at last may exhaust its virulence entirely. Certain it is that the syphilis of the present day is not the syphilis we read of in the past. Occasional cases of malignant syphilis and bad types of disease still appear to remind us of what the poison can do, and the damaging blight which the inherited taint often inflicts upon its innocent victim attests the continued virulence of the malady. In a majority of cases, however, in reasonably healthy persons, the type of the disease, as encountered at the present day, is mild; it can be controlled to a great extent by treatment. Thousands of individuals pass through it unharmed in tissue, in feature, in function, to reach a green old age and die of natural causes, leaving behind them healthy offspring.

**Course.**—After contact of the poison with a surface capable of absorption, nothing unusual happens for several weeks; this is the period of incubation.

The lesion which first appears at the inoculated point is called a chancre, whether it appears upon the genitals, the fingers, the face, or elsewhere—whether it is a dry papule, a moist tubercle, or an excavated ulcer. Within two weeks of its appearance the neighboring lymphatic glands generally become slightly enlarged and very hard, in an almost painless manner, many glands being usually involved at the same time. None of these suppurate as a rule. The appearance of the primary sore marks the beginning of the *second period of incubation.*

Generally, in about a month after the glands enlarge, after the second period of incubation the *secondary stage* commences, an eruption appears scattered more or less uniformly over the whole body, associated with lesions of the mucous membranes and a general enlargement of the lymphatic glands all over the body.

Just before the outbreak of the first of the early eruptions some patients suffer from a mild amount of fever, the temperature, generally moderate, in exceptional cases mounting quite high. Rheumatoid pains are often complained of—worse at night. Sometimes there is headache,

a general fall of hair is often noticed (alopecia), and acute iritis may be an attendant symptom.

The bodily health sometimes fails considerably during the first year, but it sometimes remains seemingly undisturbed.

At the end of a year or more there is a natural lull in the course of the disease. There may be an entire absence of symptoms for many months. In very exceptional cases the lull remains permanent, and the patient seems to be and to remain well from that time on. Usually, however, after a period of quiescence more or less long, new outbreaks appear upon the skin, upon the fauces, and in the mouth. Periosteal pains in all the superficial bones are now apt to make themselves felt, chiefly at night, and a certain amount of failure in general health is customary.

This state of things prolongs itself for a period varying from a few months to two years or more, and terminates by leaving the patient sound and well, or by merging into the next, the tertiary stage.

In the last, or *tertiary stage*, the symptoms are exceedingly variable in intensity and extent. All the superficial and the deep textures of the body, as well as all of the internal organs, may be involved. The lesions of this stage, wherever they occur, are characterized by connective-tissue hyperplasia or by gummatous deposits, and in either case by thickening of the walls of arteries within the pathological areas. In the skin, patches of tubercles and serpiginous ulcers appear. Nearly all the lesions leave deep scars. The throat may be attacked by rapidly destructive gummy ulceration, the bones of the nose may necrose and come away. Ulcers may develop upon the mucous membrane of the stomach and intestine and impair nutrition. The liver, the lungs, the kidneys, the heart, all have their chance at suffering from tertiary disease, as indeed do all the internal organs and tissues. Nearly all known chronic diseases giving symptoms through the brain or through the nerves may be simulated by the symptoms of tertiary syphilitic disease of the brain and nerves.

The bones and joints, and tendons, and bursæ, and muscles furnish appropriate symptoms, as do indeed all the structures of the body.

After yielding symptoms in the tertiary stage, more or less severe in type, syphilis in course of nature declines spontaneously. But, before this period has arrived, such vital organs may have become involved in permanent changes in their structure that health is no longer possible, and sometimes life itself cannot be sustained. Death as a direct result of syphilis is uncommon in the adult, but may be produced by the occurrence of structural changes in the vital organs, or by the cachexia of the tertiary stage. Cachexia is one of the marked phenomena of this stage, and sometimes seems to be independent of obvious organic changes in the tissues.

Syphilis is full of surprises and characteristic irregularities. No two cases exactly resemble each other, and yet the family likeness is quite strong in all. Whole groups of customary symptoms may be omitted during the evolution of the disease. Symptoms may be strangely out of place. Tertiary manifestations appear in precocious cases a few months after chancre, while, on the other hand, erythematous and scaly spots upon the palms, the soles, and in the mouth may crop out long after the tertiary period seems to have come to a natural end.

**General Pathology.**—The changes wrought by syphilis upon the organs and tissues of the body are very limited in number and very uniform in type, but the symptoms to which they give rise are as varied as are the functions of the organs and tissues involved.

The pathological individuality of syphilis shows itself in the various stages of the disease by new connective-tissue production, cellular proliferation, and in the formation of gummata. These lesions involve first the subcutaneous tissue, later the walls of the blood-vessels, and finally the central nervous system.

The roseola of syphilis is largely congestive; in the papule there is cellular infiltration as well. In the pustule and vesicle there is exudation of pus and serum beneath the epidermis. The later cutaneous manifestations are, as a rule, gummatous. The tubercles, the ulcers, the gummata of the skin, are all essentially different varieties of gummatous infiltration. They all undergo, in the evolution of the lesion, retrograde changes—coagulation necrosis—due to the scarcity of blood-vessels in the areas containing them and to disease of the vascular walls.

Of the three pathological types of lesions due to syphilis—new growth of connective tissue, arterial thickening, and the formation of gummata—the connective-tissue hyperplasia plays the most constant rôle. This tendency shows itself throughout the entire course of the disease, and is the basis of the morbid changes which take place in all parts of the body.

One of the commonest expressions of late syphilis is the production of new connective tissue in the central nervous system. Its elements, consisting of round and polyhedral cells, appear in patches of circumscribed tissue, accompanied by more or less congestion. Later on the blood recedes from the congested vessels, the new tissue becomes condensed and atrophies, and sclerosis is the result.

But there is nothing specific in this form of connective-tissue hyperplasia. Other forms of sclerotic change closely resemble it.

The gummy tumors or gummata are characteristic of syphilis and belong to the clinical history of the tertiary stage. They are formed of a collection of small, soft, round cells, which lie very closely crowded together in among the elements of the other tissues, which they push aside.

Such collections of cells may develop in any place where connective

tissue and blood-vessels are found—in short, almost anywhere in the body. Gummata commence to form usually around small blood-vessels or in the adventitia of large ones, and are found of minute size scattered along the fibrous septa of an organ in connection with more or less general connective-tissue hyperplasia, or as a single large nodule of independent formation.

The connective tissue around a large gumma becomes condensed and thickened into a sort of fibrous envelope; its central portion is necrotic and undergoes caseous degeneration. This is either due to lack of blood supply or to the action of toxins produced by the presence of specific micro-organisms, the nature and character of which have not as yet been discovered.

Gummata situated near the surface generally tend to act like abscesses, to soften centrally and then ulcerate their way to the surface, discharge and eliminate themselves in the form of gummy ulcers.

The other pathological change produced by syphilis is a modification in the walls of the blood-vessels. We find the vessels surrounding the primary lesion infiltrated and thickened with proliferated round cells. Such a condition is also a constant accompaniment of all inflammatory conditions, but especially characteristic here. A large share of the morbid phenomena which occur in brain syphilis is due primarily to changes in the walls of the arteries of the brain, commencing as an endarteritis, and culminating in a thickening of the wall of the vessel and obliteration of its calibre. The syphilitic endarterial changes occurring in the different large arteries of the body result in thickening of the arterial tunics and in the formation of thrombi. Retrograde metamorphosis and gummata lead to weakening of the vessel wall and are a direct cause of aneurism.

# CHAPTER V.

## THE TRANSMISSION OF SYPHILIS.

### Methods of Contagion—Prognosis.

That syphilis is due to a specific virus is generally conceded, although its nature and character are still undergoing investigation.

An assumption of a specific poisonous quality in that which is the essence of syphilis serves practically to assist in accounting for its phenomena and in explaining its analogy to other infectious diseases.

**Secretions which Contain the Syphilitic Poison.**—The thin serous secretion of a syphilitic chancre contains the poison probably in as concentrated a state as it can be furnished by the economy. The contagiousness of chancre and its clinical hetero-inoculability in kind upon a virgin subject have never been doubted, since the initial lesion of syphilis has been recognized as the starting-point of the disease.

The contagious properties of secretions from mucous patches and secondary ulcerated surfaces upon mucous membranes have become so obvious, clinically, that it is questionable whether this lesion does not divide the honors of propagating syphilis equally with chancre. Mucous patches and mucous tubercles, ulcers of the mucous surfaces—all these lesions secrete freely and are in a position frequently to be brought into contact with surfaces capable of absorption. The long duration of these lesions makes them especially dangerous. They last for months at a time, and relapse frequently while the syphilitic chancre, for the most part, occurs upon a patient but once in a lifetime, and is of comparatively short duration. Abrasions may be inoculated during sexual contact as well from a mucous patch as from a chancre.

Nearly all the examples of the primary lesion of syphilis encountered upon the mouth or on the face, the primary lesion of a suckling child derived from a syphilitic nurse, of a healthy nurse from an infant with inherited disease, the cases of syphilis acquired from using spoons, pipes, glass-blowers' tubes, those communicated by the surgeon through the instrumentality of the Eustachian catheter, the digital chancre of the accoucheur—in all of these, quite certainly in most instances, the vehicle of the poison has been the secretion of a mucous patch.

Hetero-inoculations of syphilitic blood, and of pieces of solid tissue, which of course contain blood, have been made experimentally by a number of physicians. Some of the inoculations have taken; others yielded

only negative results, showing that the intensity of the poison in blood is not particularly great. In former days, before the present advanced methods of vaccination with bovine virus were employed, epidemics of "vaccinal syphilis" were not uncommon. In this instance the blood is the vehicle of contagion.

The danger of transmission under the same circumstances is still to be feared if a scarifying instrument be used in vaccinating and proper antiseptic precautions are not observed.

Clinically, cases are encountered in which blood seems to be the vehicle of contagion—in which, for instance, a man acquires chancre, and confrontation fails to detect any physical lesion in the female. It is probable that the virulent quality of the blood in syphilis moderates in the later stages of the disease and under the influence of treatment.

The secretions from tertiary lesions of syphilis, serpiginous ulcers, lesions of bone, etc., do not seem to retain any inoculable quality, so far as the transmission of syphilis is concerned; but with the tertiary secretions, as with non-syphilitic pathological secretions upon syphilitic persons, it is well to reserve judgment for a time. They may possibly be capable of carrying the poison of syphilis without admixture of blood; but it has not yet been proven that they do so.

Of the *physiological secretions* it may be quite confidently affirmed that none of them is able to communicate syphilis by inoculation.

The tears, the urine, the saliva, the perspiration, the milk, the semen, have all been repeatedly inoculated without success. Some dispute has been raised upon the last two physiological secretions regarding their power of inoculation.

The apparent infections by *milk* recorded by a number of observers are more than set off by carefully observed cases in which children have suckled syphilitic nurses and remained sound, while inoculations of milk directly prove its lack of noxious quality. If the nursing syphilitic woman has a mucous patch, and the child a fissure on the lip, then the whole premises are changed, and chancre on the lip of the child is the natural result.

The infectious quality of *semen* is a matter of serious dispute, both as to its direct contagious properties and its capacity by impregnation to infect the offspring, the mother remaining healthy.

The evidence at best is only negative. A little blood may very easily escape from an abrasion in the male and carry the poison along with the semen. The mass of clinical evidence is enormous, going to show that men in full syphilis, but without local lesion, may have intercourse with impunity, and may even impregnate healthy women, and not transmit syphilis to them at all, or even to the offspring. That the semen, however, can transmit syphilis by inheritance seems to be pretty conclusively proved, but it certainly does not always do so.

In connection with the study of the virus of syphilis, and of the fluids which contain it and may transmit it, the question of **transmission by inheritance** naturally comes to mind.

**When both parents are diseased,** the child is quite certain to be syphilitic, unless the poisonous quality of the malady in both parents, and especially in the mother, be pretty nearly exhausted. Cases have been recorded in which the child appeared sound in spite of disease in both parents; and all records dealing with this question refer to cases in which, the mother being diseased and producing a number of children, some of these suffer but little, if at all, while others, born later, are manifestly syphilitic. It is certain that a syphilitic woman under treatment may produce a child in all respects healthy, and then, giving up medicine under the idea that she is well, may give birth later to a child about whose syphilis there can be no doubt.

In the majority of instances, syphilis exhausts itself by lapse of time in the mother, and her children become less and less likely to be diseased.

**When the woman alone is syphilitic,** the child is quite certain to inherit the disease. Exceptions to this rule have been alluded to above, in which the mother has syphilis, then produces a healthy child, then a syphilitic one.

**When the father alone is syphilitic,** the child unquestionably often escapes if the mother remains well; corroborative cases are constantly turning up, and there can be no reasonable doubt of the fact that a healthy woman, by a syphilitic man, may have a healthy child.

But that a healthy woman by a syphilitic man *must* have a healthy child, is altogether another question, and certainly is not a fact, if there is any value in evidence.

It seems fair to accept as proved that a syphilitic father may procreate a syphilitic child, and that, if the mother at the time of conception is healthy, she may remain so, or seem to remain so, indefinitely, the child being born syphilitic.

This statement leaves two weak points unsatisfied by explanation. The points, both negative, are these: in no case reported has it been shown that a healthy mother, who had produced a syphilitic child diseased from its father, afterward became herself poisoned by experimental or accidental inoculation. The other point is this: Colles' law, so called, states that a child with inherited disease may poison a healthy stranger whom it suckles by inoculating the breast; but that the same child cannot poison its mother. This rule cannot possibly stand, unless the mother is already syphilitic, or unless the child has conveyed to the mother an immunity to the disease. No authentic instance has been recorded in which, among the great number of cases observed, any exception to Colles' law has been noted. Caspary[1] attempted the only possible

[1] Vrtljhrschrift f. Derm. u. Syph., 4tes Heft, 1875.

positive solution to this question. He found a seemingly healthy woman with a syphilitic husband and a syphilitic child. *He inoculated the woman with the secretion of syphilis without effect*, thus seeming to prove that although apparently healthy, she already had syphilis.

In summary of the foregoing statements, it seems just to conclude:

1. When both parents are syphilitic, the child is almost necessarily diseased. Exceptions are probable under treatment of the mother, or when lapse of time has exhausted the disease in the mother; exceptions are possible during lulls in the disease, or under circumstances with which science is at present unfamiliar.

2. When the mother is diseased and the father healthy, the child is syphilitic, excepting under the same circumstances as obtain when both parents are diseased.

3. When the father is diseased and the mother healthy, the child may be syphilitic and may be healthy. Sometimes the child is diseased under these circumstances, while the mother *seems to be and continues to remain well* in all respects, as testified to by a number of perfectly competent observers.

In connection with this question of the transmission of syphilis by inheritance, three other points must be considered, namely, the date at which a woman, carrying a child, may become syphilitic without poisoning the child; the "choc en-retour" of Ricord; and the transmission of syphilis to the third generation.

Unless the mother, who has been healthy and carries a healthy child, gets a chancre before the seventh month of pregnancy, it is believed that her child will escape (Ricord, Boeck, Bärensprung, Fränkel, and others).

If the mother gets her chancre at the moment of conception, or soon after, she is apt to miscarry. If she gets it later, the child goes to term, but is born thoroughly poisoned, with poor chance of surviving. The common agreement is that if the chancre does not appear before the seventh month, the child is safe. This, however, is not always the case.

**Choc en-retour** is a fanciful expression, meaning that a healthy woman conceives by a syphilitic man, that the ovum becomes diseased through impregnation with diseased semen and in its turn poisons the mother, the latter never having any chancre, but becoming contaminated by the action of toxins circulating through the blood which are generated in the infected fluids of the fœtus.

The possibility of choc en-retour reopens the whole question of the inheritance of syphilis from the father alone, already discussed above. The possibility of this method is seriously doubted by many, steadfastly believed in by others. It will stand or fall upon a final and definite solution of the question of inheritance from the father alone. If the father can transmit syphilis to his offspring by some quality his malady has imprinted upon his spermatooza—and there is no reason to believe

that this is impossible—then it is very probable that choc en-retour exists, and that the prolonged presence of the child in utero necessarily poisons the mother, without chancre, giving her perhaps a modified form of the disease—not enough poison to betray itself by the usual symptoms of syphilis, but enough to protect her from acquiring the disease afterward in a natural way, or by inoculation (Caspary), and preventing her child from giving her chancre of the breast, thus justifying Colles' law.

**The transmission of syphilis to the third generation** has generally been doubted. Several alleged cases have been reported, some of which seem to be unwarranted assumptions, while in others the history is incomplete and unsatisfactory. The theory that syphilis having been once transmitted by inheritance degenerates into something like scrofula, and is transmitted as such, cannot be sustained.

Enough evidence from different quarters has not been collected to declare that syphilis may be transmitted to the third generation, although such a possibility is not out of the question.

**Methods of Contagion.**—The methods by which syphilis may be acquired are many.

It may be acquired by contact of a surface capable of absorption, upon any part of the body, with the poison of syphilis contained in any fluid capable of holding it, whether it be upon the body of the person yielding the poison or upon some indifferent object. Thus its transmission may occur by means of direct or mediate contagion.

Syphilis acquired by sexual intercourse in the usual way is an instance of *direct contagion.* The surface capable of absorption upon the healthy person is brought into direct contact (usually) with the source of the poison. But there are many methods of direct contagion other than that by sexual intercourse. As illustrating these methods may be instanced: the chancre of the lip, acquired by kissing, a mucous patch being the source of the poison; the digital chancre of the surgeon, acquired while manipulating poisoned parts; or of the accoucheur, acquired while practising the vaginal touch; the chancre on the nipple of the healthy nurse, taken from the mucous patch in the mouth of the syphilitic child, and *vice versa.*

As an instance of *mediate contagion* the following example may be quoted: A married man with a long prepuce has intercourse with a former mistress. He returns home unwashed, and repeats the sexual act with his wife, leaving in her vagina some syphilitic secretion which he had obtained from the mistress, and carried in the folds of his prepuce. The man escapes infection, but his wife acquires chancre. Spoons and forks, cups and tobacco-pipes, tattooing-needles, are well-known media of contagion, receiving saliva which contains the secretions from mucous patches in the mouth, and depositing it upon a fissure in the lip of another person. In the industry of glass-blowing, the passage of the

tube from mouth to mouth has been known to effect a widespread distribution of the poison. Vaccination as a means of mediate contagion has already been noticed. Surgical instruments have sometimes been the medium of contagion. Wet-cups have carried the disease, the transplantation of teeth has done the same, and the practice of the religious rite of circumcision.

A knowledge of the variety of methods by which syphilis may be conveyed is of great value to the patient, who is ordinarily ignorant of it. It is well to instruct him in this, as well as to give him directions about the local and general treatment of his disease, so that, while curing himself, he may know how to preserve those by whom he is surrounded from infection.

**Syphilitic Reinfection.**—It is notorious that a patient while syphilitic cannot take the disease. Thousands of inoculations have been made upon such patients by hosts of experimenters. Protection against future attacks is secured by a single infection; and yet there are a number of cases on record, resting on evidence which silences criticism, proving that true syphilis may be acquired twice by the same individual, and may in one lifetime run through its different stages twice. It follows that the first syphilis must be well, or the second could not have been acquired.

Second attacks of true syphilis unquestionably do occur. This fact is not more strange than that of second attacks of other maladies, such as smallpox, scarlet fever, measles, vaccinia, etc., one course of which generally protects a patient for life.

An attentive reading of many cases of so-called second infection makes it clear that there is no second attack at all, but that some forms of pseudo-chancre exist which are not at all uncommon, such as ulcerated gumma, herpes, and relapsing induration at the site of the original sore.

While, then, it must be granted that second attacks of true syphilis do occur, although very exceptionally, it is fair to conclude that many of the reported cases are instances of one of these forms of pseudo-chancre, and not second attacks of syphilis at all.

**Prognosis.**—Practically, in the majority of instances, syphilis is a mild disease. It gets well, to all intents, under a variety of treatments, or under no treatment at all very often; and the main advantage possessed by one treatment over another is the power which it may give of immediately controlling symptoms which directly threaten life, limb, or functions, and the guaranty afforded by experience in its use against relapse or serious disease late in life.

Therefore, allowing that bad cases may continue to relapse almost indefinitely, and that some late lesion, due to syphilis, may occasionally appear after any treatment upon a patient once affected, even possibly up to the hour of his death, yet the common duration of the disease is only about two and a half to three years, and many cases do not have symp-

toms longer than during a few months. After the first year or year and a half, there is generally but little trouble; and when the disease has fairly died away the patient is as well as ever, and may go on to a ripe old age without ever again hearing of his enemy, having healthy children, and passing through the changes incident to advancing life exactly like any one else.

Uncertainty as to what the disease may eventually do interferes seriously with accuracy of prognosis of syphilis. The old notion, therefore, that a light beginning in syphilis can be counted upon to indicate a type of disease in itself necessarily mild, is not accurate. As far as the first symptoms show anything, however, they do in a measure declare the character of the subsequent symptoms, but they do not guarantee it; the element of treachery steps in, and no honest prognosis can be a very positive one.

A long incubation to the chancre, mildness in the primary lesion, a long secondary incubation, mildness in the earliest eruption (roseola) are qualities in the early symptoms which generally indicate a mild type of disease.

On the other hand, a short incubation to the chancre, severity in its symptoms or the duration of the latter, intensity in the local character of the first outbreaks (pustular instead of erythematous), and resistance of the latter to treatment—particularly that form of disease in which symptoms usually occurring in the tertiary stage come on early in the course of the malady—all of these features in the beginning of syphilis indicate severity in the type of the disease, and the prognosis must be modified accordingly.

It often happens that cases mild in the quality of their symptoms are severe in regard to duration.

*The influence of constitution* upon the course and the type of syphilis is very obvious. Two persons infected from the same source do not have exactly the same type of disease. Both acquire identically the same poison, but the symptoms are quite certain to run a different course.

In a general way, it is true that a healthy person in good hygienic surroundings, living a regular life, is best able to stand an attack of syphilis, and ought to escape lightly; while a sickly person, in bad surroundings, should by right be overwhelmed by the disease. This is in a measure true, but exceptions are too common to make the fact of much value. A vigorous youth in the flower of health may wilt under the blight of syphilis, while a puny consumptive or a white-blooded dyspeptic suffers very little more while the disease is upon him than he did before he acquired it.

Despite exceptions, constitution does, on the whole, modify the course and intensity of the symptoms of syphilis. The rheumatic and the scrofulous tendencies are obvious in their effects upon the symptoms of the

disease. In the individual of so-called gouty habit, the evolution of the disease is slow, the type of eruptions dry and scaly, chronic, relapsing, often quite superficial. Pains and joint troubles, iritis, and bone disease, arterial complications leading to brain symptoms, are more to be expected in this class of patients.

The condition of patients with phthisical tendencies is nearly always aggravated by an intercurrence of syphilis.

Patients who are lymphatic, and who readily suppurate from injuries, the effect of which would be easily thrown off by another, have moist vesicular and pustular lesions early in the disease for the most part, and are prone to run early into ulcerative lesions.

Syphilis influences the healing of fractures. Cases are reported in which firm union was delayed until the patient had been put under the influence of large doses of the iodide of potassium, although at the time the patient was not suffering from any obvious symptom of syphilis.

Sometimes ordinary wounds upon a syphilitic person fail to do well, and if irritated, assume the character of syphilitic ulcers. This tendency is decidedly lessened by the observance of strict antisepsis in the treatment of all traumatisms upon syphilitic subjects.

Prostrating and excessive work, irregular habits, excess of any kind, dissipation, bad hygiene, poor food, insufficient clothing, over-treatment (by excess of drugs), under-treatment (of too short duration), no treatment, bad treatment—all tend to aggravate the general prognosis.

Sex also influences the prognosis. Women are more apt to become anæmic than men, and to grow greatly debilitated. The duration of syphilis with them, and the periods of latency, are seemingly longer.

The age of a patient certainly influences prognosis. The activity of the disease is very great in babyhood, and young children very frequently die of syphilis, inherited or acquired. Old people, on the other hand, have less vitality and power of resisting disease, and syphilis acquired in advanced life is therefore often severe.

The truth is that syphilis is in most cases a very manageable disease, and prognosis is more influenced by the intelligence exercised in treating it than it is by all other circumstances combined; but there are occasional exceptions to this rule, as there are to all others relating to syphilis.

# CHAPTER VI.

## THE CHANCRE—PRIMARY LESION OF SYPHILIS.

THE *incubation of syphilis* is that period of rest which always occurs between the absorption of the virus and the appearance of the chancre at the spot where absorption took place. This is termed the *first period of incubation*. Its average duration is twenty-one days, and it has been known to occupy nearly all the intermediate points between ten and sixty, or even seventy days; but such long periods are decidedly exceptional. The rule is that the disease generally makes its appearance in the primary sore within four weeks after exposure.

This local outbreak in syphilis always occurs at the point of entrance of the poison, and the disease continues, apparently, confined to this point for a period of so-called *second incubation*, after which the symptoms of the disease become generalized.

The initial lesion or first stage of syphilis is a chancre, which appears after a period of incubation upon the spot at which the poison was first absorbed. It occurs clinically under a variety of forms which resemble each other very little. There is indeed nearly as great a variety in the local expression of primary syphilis as is known to be the case in secondary syphilis. Chancres, as encountered clinically upon the male and female genitals, are: (1) the **raw erosion**; (2) the **superficial ulceration**; (3) the **deep, funnel-shaped ulcer**, always indurated; (4) the **herpetiform chancre**; (5) the **mixed chancre**. The syphilitic chancres of the lip, of the nipple, of the general integument have their type-forms, and also chancres of the urethra, anus, or rectum.

**The Raw Erosion.**—This is the most common form of syphilitic chancre. Most estimates place its occurrence as high as sixty to seventy-five per cent of all forms. It is found in both sexes on the integument, as well as upon a mucous or semi-mucous surface. It is of variable size from that of a small split pea to a large beefy patch as big as a copper penny when advanced in growth. The surface may be any shade of red, occasionally a light subdued pink. Generally the color approaches a livid purple, and later on becomes coppery. There may be a central adherent false membrane, but usually the surface is literally raw; not discharging pus, not ulcerated, but yielding a trifling discharge of bloody serum.

In shape this erosion is oval or irregularly rounded; perhaps it may run along a natural fissure. Several may occasionally coexist upon one patient, appearing simultaneously. Induration of these erosions is com-

mon, sometimes partial, sometimes beneath the whole surface, often parchment-like and imperceptible unless the whole integument at the seat of the erosion be lifted up, and the lesion gently pinched laterally between the thumb and finger. Sometimes, on the other hand, the induration is very prominent and bulges up above the surface like a solid tubercle, with a flat, raw top (ulcus elevatum).

**The Superficial Ulceration.**—This form of primary lesion is very common, and is much like the last in most of its features. In fact, many chancres are first erosions, then ulcerate superficially, and perhaps later return to the eroded state. The only difference between this chancre and the erosion is that this form is ulcerated. The ulcer is slight, its borders are adherent and sloping. Its underlying induration may be parchment-like, is more apt to be of split-pea variety, or there may be an elevated tubercle with a dome-like, ulcerated cap. Finally, the induration may be slightly excavated downward, and then the ulcerated surface is correspondingly depressed. The floor of these ulcers is grayish, the discharge scanty, thin, sero-purulent—perhaps bloody.

The Hunterian chancre, formerly looked upon as a type, is almost rare enough to be an exception. It is simply a very pronounced chancre of this last variety, in which the induration is considerable and the excavation proportionately great. The chancre is a large mass of woody induration, of rounded form, in the centre of which is an oval or rounded ulcer extending deeply into the induration, funnel-shaped, with a pultaceous floor, adherent sloping edges, and yielding a thin, moderate, puriform discharge.

**Herpetiform chancres**, so called, consist of a collection of chancrous erosions. They resemble clusters of herpetic vesicles and may be mistaken for them. On this account in doubtful cases an opinion should be guarded. The diagnosis is made by the persistency of the lesions, moderate induration, and, later, involvement of the inguinal glands.

The **mixed chancre** is a combination of the two sores, the chancroid and the syphilitic chancre. Each sore runs its course, and the compound lesion possesses the characters of both.

A mixed chancre may result from the inoculation of either sore upon the other, and its characters will be correspondingly modified according to the period of development of either sore; either one may be nearly well before the other gets fairly under way. If the compound poison is inoculated, the chancroid would naturally be well along in its course before it assumed any syphilitic features. The mixed chancre has been produced experimentally.

Inoculation of the secretion upon a healthy subject clinically may produce chancroid alone, or mixed sore.

*Chancre of the general integument* occurs as a flattened papule or elevated tubercle, or excoriated patch, or a moist, flat tubercle, or an indu-

rated ulcer. All of these forms have been seen and studied in connection with experimental auto- and hetero-inoculations, and they may be encountered clinically. The lesions resemble the same varieties upon the penis. The excoriations are often in part or totally scabbed over; there may be nothing more than an insignificant, dry, scaling papule upon the skin to mark the point of entrance of syphilis. The flat, moist tubercle resembles exactly the condyloma—the flat, mucous tubercle of the skin. Finally, a superficial or a deep excavated ulcer may mark the starting-point of syphilis upon the skin, and in such case the induration of the ulcer is apt to be quite extensive.

*Chancre of the lip* is generally a globular mass of induration as large as a marble, with an excoriated or exulcerated surface.

*Chancre of the tongue* has no distinctive characteristics, but resembles the raw erosion found upon the genitals. It is generally located on the dorsal surface and sometimes on the side of the lingual mucous membrane. Its surface may be shiny and red or covered by a membranous film. The submaxillary glands are always enlarged.

*Chancre of the tonsil* is not of frequent occurrence. When it does occur it is characterized by a thick, indurated, brawny swelling, sometimes with an eroded surface, sometimes ulcerated and covered with a whitish or greenish exudation.

*Chancre of the nipple* acquired by nursing a syphilitic child may be a large, deep, indurated ulcer, a brawny excavation, an excoriated or ulcerated, indurated fissure, or a flat, mucous papule more or less livid, moist, or dry, scaly or scabbed, sometimes but little indurated.

*Urethral chancre* may be observed through the endoscopic tube in the form of a rounded erosion or flat ulcer. Generally, urethral chancre is situated just within the meatus, one or both lips of which it may involve. Occasionally, however, it occurs at a considerable distance within the canal.

Sometimes the existence of urethral chancre is disclosed by the presence of a lump along the course of the urethra, usually painful upon erection. At this spot some pain is apt to be complained of on urinating. A slight discharge flows from the urethra, more mucoid than purulent, sometimes bloody. This discharge commences at a considerable interval after the sexual contact to which it was due. The slight discharge continues for a number of weeks, and the scar left by the chancre may subsequently occasion more or less stricture of the urethra. The inguinal ganglia are indolently enlarged and indurated.

*Chancre of the fingers* occurs at the site of an abrasion or hang-nail on the hands of surgeons or nurses. The notable feature of such a sore is the great amount of thickening surrounding it, with an absence of definite ulceration. The surface is raw, shiny, red. The epitrochlear and axillary glands are indurated and enlarged.

*Chancre of the anus* is found around the margin of the sphincter in one of the folds. On this account and because the induration is not generally great, this lesion may go unnoticed. As an irregular ulceration or erosion it approaches in type a similar lesion on the general integument.

In the female, around the ostium vaginæ and on the labia, erosions, often not appreciably indurated, excoriations, flat, raised mucous tubercles, and the regular deep indurated ulcer, may each be encountered as the herald of future syphilis.

Upon the cervix uteri the chancre usually appears on the anterior lip as an elevated or flattened erosion, with a red areola and covered with a membranous pellicle.

**Course.**—The first evidence of inoculation of syphilitic virus upon the skin of a healthy subject is a flat, dry redness, or a raised, hard papule, red on top. Generally, upon a mucous membrane, an excoriation or a small superficial ulcer is found from the start. Sometimes a mass of induration forms first, and this afterward excoriates or ulcerates. On a mucous membrane a vesicle or a pustule may precede the shedding of the cuticle which leads to the excoriation, but its existence is ephemeral. Induration of the base may precede the breakage of the cuticle, and be excessive as compared to the latter; or the opposite condition may obtain, there being considerable ulceration after matters have progressed for a time and very little hardness. Exceptionally, the whole prepuce becomes stiffened with a cartilaginous induration. An acute livid flush of the integument may precede this induration, or the latter may form gradually, especially if the chancre involves the prepuce near the frenum.

The erosion or ulcer increases in size for a varying period and to a varying extent; from an erosion, through irritation, it often becomes an ulcer. It remains unique, not poisoning the integument in the neighborhood, and not giving any pain; yielding its watery discharge, attended by its lymphangitis and its adenitis in the second week, and, after lasting from two or three weeks to as many months, it finally gets well, leaving no trace in most instances. If the ulcer, however, has eaten through the papillary layer of the skin, if it has been phagedenic at all, then a scar is left, proportionate in extent to the amount of tissue destroyed. These scars often remain indurated for a considerable period. They are not customarily pigmented.

*Induration* is a feature of chancre the importance of which has been much overrated. It is not an absolute essential of syphilitic chancre, although unquestionably it is a very constant symptom. Induration occurs in several forms:

The most common is the parchment-like induration found underlying an ulcer or an erosion, and often appreciated with difficulty, unless the ulcer be pinched up laterally between the thumb and finger. This

variety of induration is common in the female; it is rarely simulated in other forms of disease; it does not involve the subcutaneous or submucous tissues.

The next form is characteristic, but not very common. It is called the split-pea induration. Immediately underlying the ulcer is a substance of cartilaginous or woody hardness, like a split pea, convexity downward. Its size varies with the size of the surface lesion. It is very nearly, indeed often absolutely, insensitive to moderate pressure. It does not shade off into the tissues around it. It is not adherent to the deep fascia, but it ends abruptly in all directions, and is as cleanly defined as would be a foreign body set into the skin attached to the ulcer by its upper surface.

The last form of induration is excessive. It resembles the previous variety in its quality and behavior as to the surrounding tissues, but it may greatly surpass the limits of the surface lesion, be convex or concave on its surface, or involve irregular areas of skin, as when the whole prepuce or a portion of it is involved in a wood-like hardness in connection with chancre.

Induration often precedes the breakage of the skin, and very often, when it has been excessive, outlasts the healing of the ulcer, continuing perhaps for several months, or in the scar for years. It may be of only short duration—ten or twelve days, coming late and going early. The thin, parchment-like induration is the most transitory. Once commencing to disappear, induration may relapse, and occasionally outstanding indurations appear in the neighborhood not connected with the initial lesion, but formed around the lymphatic vessels, and these indurations may possibly ulcerate (Fournier). Phagedæna destroys induration.

Something like any of the above forms of induration may appear with other lesions than chancre, and indeed upon persons not at all syphilitic. It is never safe to depend upon this sign for a diagnosis. It is most valuable as a corroborative symptom, and more constant as a symptom of syphilitic chancre than any other one symptom, except the length of the period of incubation; and this latter may be unattainable. Ordinary inflammatory induration generally is very different from specific induration. It is red on the surface, painfully sensitive to pressure, adherent to the skin and the parts beneath, losing itself gradually in the subcutaneous tissue, with no clearly defined edge; yet, in spite of all the differential characters, syphilitic induration may be so closely simulated by a non-syphilitic lesion that, alone and without strong corroborative evidence, it is not of enough value to establish a diagnosis of syphilis.

The induration of a small gumma of the semi-mucous membrane of the prepuce, as appreciated by the finger, is sometimes absolutely, and

in all respects, a typical induration as found in the best-marked cases of syphilitic chancre.

Syphilitic chancre is rarely complicated. Vegetations may grow up around it and its new surface may granulate, or may take on a whitish or necrotic pellicle. Some amount of inflammatory disturbance may complicate the ordinarily indolent and undemonstrative chancre, leading to its swelling, pain, suppuration, and giving to it some of the features (auto-inoculability) of its more formidable local rival, chancroid. All of these complications need but to be mentioned to be understood. The rarer complication of chancre with chancroid has been described (mixed chancre).

Phagedæna complicating syphilitic chancre occurs usually in the gangrenous form. If the whole base of the sore is involved, the induration disappears in the phagedenic process. Sometimes the slower form of phagedæna is found, but generally this variety is not very extensive, when complicating a syphilitic primary lesion. A description of both forms of phagedæna has already been given in connection with chancroid, and nothing further need be added here except an allusion to the fact that mercury internally, although harmful to phagedæna occurring upon the patient who is not syphilitic, is decidedly beneficial to the phagedæna attacking syphilitic chancre.

It is generally believed that a phagedenic chancre portends a bad type of syphilis, and this is doubtless so, since phagedæna is not a quality of the peculiar virus with which the patient has been poisoned. The phagedæna is due to the patient's own quality of constitution, and it is fair to suppose that such a constitution will suffer from an attack of syphilis more seriously than another.

*Lymphangitis.*—This consists in an indolent thickening, with induration of the wall of one or more lymphatic trunks. The thickening involves a certain amount of the surrounding perivascular connective tissue. These rigid cords with occasional knots upon them may be felt along the sides or back of the penis, sometimes part way from the chancre backward toward the root of the penis, sometimes only perceptible near the pubic symphysis. The cords vary in size with the amount of infiltration of the walls of the lymphatic trunks, and are larger, according to the amount of perivascular tissue involved. Very rarely the inflammatory process around the vessels goes on to suppuration. Generally the lymphangitis, if it occurs, precedes the inguinal adenitis by a few days. It is, as a rule, painless, and of not the least importance. The integument over the thickened lymphatic trunks is not reddened. There is no peculiar character by which this malady may be known from a chronic mild lymphangitis of the larger lymphatic channels occurring spontaneously, and having no connection with syphilis as a cause. All that can be said of syphilitic lymphangitis is, that if it occurs with syphilitic (uninflamed)

chancre, it is very certain to be peculiarly indolent and painless, and to be characterized by a high degree of induration. Pathologically the lymph spaces are infiltrated with hyperplastic exudation. Syphilitic lymphangitis requires no treatment.

*Syphilitic Bubo.*—The first set of lymphatic glands along the line of absorbents which originate in the neighborhood of the initial lesion of syphilis almost invariably become the seat of certain changes which stamp them with peculiar value as aids to the diagnosis of the nature of the primary lesion. The bubo of syphilis may therefore be situated anywhere upon the body where there is a lymphatic gland, provided the radicals of the lymphatic trunks leading to that gland originate in the neighborhood of the chancre. Thus chancre of the lip has its bubo under the jaw; chancre high up on the cheek, in the pre-aural gland; of the hand, in the epitrochlear gland; of the breast, in the axilla; of the penis, in the groin, etc.

The syphilitic bubo almost invariably comes on during the second week after the appearance of the primary lesion, between the eighth and eleventh days in cases of experimental inoculation. One gland generally first becomes enlarged, and then a number of others, until (in the groin) a cluster of altered glands, not matted together, but lying separately, are found, constituting what has been termed a "pleiad," and, when typical, very distinctive of syphilis.

The number of glands in a pleiad varies from two or three to six or eight. Where there are many, one is usually larger than the others. Generally the glands in both groins are involved. Each of the little glands of the altered group is quite hard, round or oval, painless on pressure, not adherent to the skin or to the tissues lying under or around it, and each is entirely distinct from the others. The skin lying over them is not reddened, and the size of each gland varies from that of a pea to that of a marble. When the number is considerable, the size of each is usually smaller than when there are but few. Occasionally, instead of the pleiad there is one very large, hard, oval gland, with one or two quite small ones; and still more rarely the bubo is single, an enormous lump as large as an egg existing in one or both groins. These lumps are composed of a mass of indurated hyperplastic tissue.

The swelling of these glands is called indolent because of their slow course, their painless and non-inflammatory character. Very often, however, when they begin to swell they are slightly painful; and occasionally they go on to suppuration, either centrally or as a periglandular suppuration.

While the syphilitic bubo is generally multiple, in certain situations it is more apt to be single, as under the chin, under the jaw, at the elbow, although in the latter situation there may be a secondary pleiad in the axilla.

The duration of syphilitic bubo varies from a few weeks to a number of months. Sometimes the glands never subside to their original size. They are almost constantly present during the first eruption, and at this time they occasionally grow somewhat larger and harder.

The treatment of syphilitic bubo is that of general syphilis. No treatment is called for until a general eruption comes on. Local measures are useless. If pain and inflammation appear as complications, these symptoms are to be appropriately met.

**Treatment.**—When once the syphilitic poison has had access to the absorbents, the patient from that moment has syphilis, and he is therefore diseased in his whole body several weeks before the chancre appears. The folly therefore and the uselessness of destroying the primary lesion with caustics or with the knife, and of any abortive measures seem obvious.

*Excision of the chancre*, with the possibility of effecting a cure of the disease in this manner has been advocated upon the theory that the poison, after being absorbed, lies latent locally throughout the period of incubation, and then commences to increase in quantity, at first only locally; that after a period it reaches the lymphatic glands, and there increases and multiples again, remaining local in its new position until, during the period of secondary incubation, it has had time to infect the general system, after which it becomes general and manifests itself by an eruption. This theory is not sustained by recent clinical and pathological studies of the morbid process attendant upon syphilitic infection, which have demonstrated conclusively the absolute futility of excision of the chancre, even with the adjacent ganglia, as a prophylactic measure.

The same conclusion has been reached regarding the early use of mercury during the primary stage as a preventive treatment against the general development of the disease. It is not only hopeless to expect to curtail in the slightest degree the progress of the disease by such a course, but it is believed that a harmful influence may be exerted thereby, the later lesions becoming severe and obstinate to treatment, not to mention the possibility of errors in diagnosis which may involve both patient and physician in a serious dilemma fraught with doubt and uncertainty.

The best course to adopt then for the primary sore of syphilis consists in local and expectant treatment. The parts may be kept clean by any mild antiseptic lotion and the sore treated with a moist or dry dressing. Black wash is much used. This is more suitable in the advanced stage of the ulcer. A mild sublimate soltion (1 to 3 : 4,000) is not inappropriate. Calomel is used as a dusting-powder alone or in combination with equal parts of bismuth and oxide of zinc. When the chancre shows a tendency to irritation and suppuration it is best treated, after being properly cleansed, with iodoform or one of its substitutes, among which may be mentioned iodol, aristol, europhen, and nosophen. The last prep-

aration has proved very satisfactory and is especially commended. The mixed sore must be treated like a chancroid.

If the lesion be complicated with phimosis the treatment should be conducted on the lines laid down under that heading.

[For a differential diagnosis between chancre and chancroid see Chancroid.]

# CHAPTER VII.

## CONSTITUTIONAL SYPHILIS.

### Stages of the Disease.

Syphilis is not a continuous chain of symptoms. It is a broken series of outbreaks, varying in intensity, in duration, and in the length of the intervals between them. During these intervals the patient may seem perfectly well. That the poison continues active during the periods of latency (the early ones) is evident from the fact that syphilis has been acquired from the blood of a subject not at the time bearing any trace of syphilis upon his person; that syphilitic women, during periods of most absolute latency, have brought forth syphilitic children; that traumatisms upon syphilitics, in a period of latency, often call out syphilitic lesions.

Therefore it becomes impossible to state absolutely that the disease is naturally divided up at all. It may be one continuous malady with remissions, but really continuing all the time. Yet facility of description, custom, and the peculiar character of the outbreaks of syphilis have justified its division into stages, and these stages are commonly known as primary, secondary, and tertiary.

**The primary stage** is all that portion of the disease lying between the moment of infection and the time of appearance of the first general eruption with its fever and general ganglionic engorgement; it therefore includes the initial lesion with its accompanying lymphangitis and adenitis, as described in the last chapter.

**The Secondary Stage.**—As soon as the secondary incubation has passed, secondary syphilis begins. It may date as early as three weeks from the time of appearance of the chancre; it generally does not commence for six weeks or two months, and may be delayed much longer, especially if mercury has been used in treating the primary stage. Most of the symptoms of this stage are superficial. They are first congestive, and occurring on the mucous as well as on the cutaneous expansions. Gradually, as time passes, the lesions become deeper seated, and finally the second merges so gradually into the tertiary stage that it is impossible to fix upon a positive boundary between them.

The duration of secondary syphilis, like the duration of the whole disease, varies so greatly that it is not only impossible, but even unwise, to attempt to confine it within definite boundaries. In a general way, in

most cases the symptoms merge into the tertiary forms during the second year; but secondary lesions continue in many cases to crop out occasionally in the third year or later, intermingled with the deeper lesions of tertiary stage. It is not at all uncommon for a patient with a gummatous, destructive ulcer of the throat to have also upon his palm a superficial scaly patch very similar to what he may have had during the first year of his disease.

And, on the other hand, but more rarely, the symptoms legitimately belonging to tertiary syphilis occasionally come on earlier, and appear among the secondary symptoms. Gummata in various situations may thus appear prematurely; nodes on bones, advanced symptoms of nervous disease, hemiplegia, epilepsy, sometimes show themselves at the end of six months, and are followed by secondary symptoms, instead of appearing at their regular time about the second year or later.

**The tertiary stage** commences on the boundary line of secondary syphilis, about the second year or sometimes considerably later, and embraces everything which may happen afterward due to the disease. The lesions are infiltrative, gummatous, often destructive, ulcerating, and include most of the connective-tissue parenchymatous changes and gummy deposits which involve the viscera.

In inherited syphilis the symptoms of both secondary and tertiary stages are customarily more or less combined. The child, when born, often has lesions in its lungs, liver, kidneys, thymus, and spleen, with changes in the epiphyses of the long bones, and at the same time superficial, scaly, erythematous, papular, and excoriative patches upon its integument and mucous membranes.

In acquired syphilis the whole of the tertiary stage may be absent. The disease not uncommonly, under judicious treatment, ceases entirely at the end of the secondary stage, and the patient lives for years without another symptom, raising healthy children, and himself to all appearances well.

*The secondary incubation period* commences when the chancre appears, and ends when general symptoms come on. This period often is not one of latency, strictly speaking, since active symptoms of syphilis are usually present upon the patient during the whole of it, for the chancre has rarely healed before the first eruption comes out (unless treatment keeps it back); and even if the chancre has gone, the inguinal glands are certain to remain engorged during a much longer time than the period of secondary incubation.

The length of the second incubation in untreated cases varies from twelve days to between four and five months; but commonly, in untreated cases, it lasts about six weeks.

During the second incubation, while the organism is becoming saturated with the poison, the general health may appear flourishing, or

show some signs of falling off, yet there is often no positive failure of health until the eruptions appear, and sometimes no obvious failure even then.

### Symptoms Attending the General Outbreak of the Disease.

All descriptions of syphilis refer to the symptom of fever as being one of the most constant accompaniments of the constitutional disease.

It comes upon the patient unawares during the period of second incubation, and precedes the outbreak of the first eruption. It is this fever to which the name syphilitic is given.

The type of the fever may be continued, remittent, or intermittent. It may consist of a single short outburst, or may last for days. More rarely, it is accompanied by great prostration, attended by headache and epistaxis, and assumes a type suggestive of typhoid fever.

Its occurrence is by no means uniform. If it is looked for by aid of the thermometer, it will be often found; otherwise it may not be thought of either by the patient or physician, excepting in a minority of cases when the prostration is great or the range of temperature high.

The thermometer rarely marks higher than 102° F. in syphilitic fever; 104° has been pretty generally considered to be a point above which it does not go.

The symptoms attending the fever are very variable. Anæmia may be quite marked, the pallor being due to the well-known diminution in the hæmoglobin of the blood, first pointed out (1844) by Grassi. General depression and a feeling of being sick are common complaints. Pains in the bones, in the joints, under the sternum, in the side and back, in the head, all of them worse at night, are apt to be complained of. The night headache is pretty constant and sometimes frightfully severe, the pain coming on and yielding at stated hours, often with great regularity.

When the fever runs high and an eruption appears, the mistake of confounding syphilis with measles, or even with smallpox, has been made.

Jaundice may come on with syphilitic fever, due to catarrh of the bile ducts, from engorgement of the mucous membrane, or pressure upon the ducts by enlarged glands.

Pressure upon the lower third of the sternum will sometimes evoke a pain not otherwise complained of, and the anæmia may be great enough to give the soft, blowing character to the first sound of the heart.

Syphilitic fever usually disappears soon after the general eruption comes out. Its own special features are so varied that its diagnosis depends upon the previous (or actual) existence of a chancre and the presence of evidences of general syphilis.

During syphilitic fever, or at the beginning of general syphilis, when

there is no fever, it is common to observe other symptoms which mark the onset of the secondary stage. These need not be fully described here, since they may be found under their appropriate heads; but, before going into syphilis as affecting the tissues and organs, it is well to mention them in outline.

With scabs in the hair and the mottling of the skin or circumscribed eruptions the ganglionic pleiad in the groin still remaining, and perhaps the chancre being still raw, we may find that one or both epitrochlear glands are indolently indurated, resembling the glands in the groin, and certain glands in the posterior chain of the posterior cervical glands may be similarly affected. The glands most characteristic among these are those lying on the occipital bone on either side. These glands, as well as the glands in the groin, generally disappear, with or without treatment, as the disease advances, and it is not well to depend upon them to corroborate syphilis after the first few months.

Another symptom is a generalized falling of the hair (syphilitic alopecia). The hair thins out over the whole scalp, does not fall in patches, and with this there may generally be noted a tendency to a fall of hair from the beard and eyebrows, and more or less from the whole body in severe cases. This alopecia, however, is often confined to the scalp. When the hair falls late in syphilis, if the falling out of hair is general, it is due to cachexia; if it is local, it is due to a local physical lesion (ulcer) involving the papillæ, and the hair does not generally return when the disease gets well, as it does after the alopecia of early syphilis.

The throat symptoms—erythema and mucous patches—to be described later, are very characteristic, and should always be looked for in the outbreak of general syphilis.

Certain sympathetic nervous symptoms have been spoken of which occur more particularly in women early in syphilis—inability to distinguish heat from cold, anæsthesia of certain limited areas of skin, marked coldness of the hands and feet, etc.

Some patients, especially women, suffer from mental disturbances, such as hallucinations, delusions, and hysterical manifestations.

# CHAPTER VIII.

## THE GENERAL TREATMENT OF SYPHILIS.

SYPHILIS is naturally a self-limiting malady, and its general treatment may be, and often is, left entirely to nature. Many a woman, and occasionally a man, gets syphilis without knowing it, and runs through the disease into health without any specific treatment at all. Indeed, it may perhaps be justly doubted whether treatment of any kind can shorten the duration of syphilis, for the disease will, and it does, crop out at remote dates after any and all kinds of treatment (less often after certain kinds of treatment than after others), and there is no positive and certain test which can be applied to a person to determine whether he is, after treatment, free from the disease or not.

There is no doubt whatsoever that certain drugs restrain the manifestations of syphilis and cure the symptoms. Among these the different preparations of mercury and of iodine undoubtedly hold the first rank; but the opponents of the internal use of mercury claim that, by curing the earlier symptoms, the disease proper is only being suppressed, that its total duration is thereby prolonged, and its later symptoms rendered more obstinate and more destructive. This assumption, however, is the result of the heat of controversy more than of any calm recognition of facts.

Who shall say, in a given case, how long syphilis is to last? There is no certain and reliable standard by which the disease may be judged or the quality of its virulence predicated. There is an unknown element in syphilis which alone can explain the endless irregularity of its forms and the picturesque variety of its symptoms.

One fact about syphilis is well known; it has symptoms, and certain drugs will keep down those symptoms; and it is as wise and as just to say that the quinine which breaks tertian ague only prolongs the disease by suppressing the symptoms, as it is to hold that mercury prolongs syphilis by keeping symptoms in check.

Moreover, the use of mercury has been shamefully abused in times past. Crusades have been preached against it by valiant champions of other and seemingly more simple methods, yet always, century after century, the profession clings to mercury; and to-day it heads the list of specifics, as being the most efficient of all known drugs, in the writings of a great majority of the recognized authorities upon syphilis. The only question is how to use mercury so that it shall inflict the greatest possible harm upon the disease without injuring the patient. A solution of this

problem is what is required. The senior author has done what he could toward solving it.

All sorts and varieties of other drugs—copper, gold, arsenic, sarsaparilla, and various vegetable so-called blood purifiers—have been and are to-day vaunted as possessing curative powers over syphilis, as have also the waters of numberless natural mineral springs; but no two authorities agree in defining the claims of these adjuvants to treatment, while all advocate mercury administered in one way or another.

Finally, all sorts of cures have been tested: water cures, dry cures, sweating cures; cures by the grace of God (Diday)—that is, where nothing is done in mild cases beyond what is suggested by ordinary hygiene, the disease being left to run itself out by nature; cures by syphilization and by tartarization; and finally, by drugs, cathartics, diuretics, sudorifics, tonics, mercury, iodine, etc.

When so many methods are strongly advocated, it seems fair to suppose that the disease in question is incurable; but, on the contrary, patients get well, or seemingly well, under all these methods and under all systems of treatment. The reason of this seems to be that the disease is self-limiting and symptoms cease to appear, in a majority of cases, in the long run, with treatment, without treatment, sometimes despite treatment.

The aim of a rational treatment, therefore, must be: to suppress symptoms and prevent them from doing harm during their existence; to control symptoms and prevent relapse without harming the patient; and so to manage the disease that it may not be contagious during its existence (by keeping down such symptoms as yield contagious secretions), that the patient may be made able to marry as soon as possible and to produce healthy offspring, and that the symptoms of the disease during their progress shall be restrained from leaving unsightly scars or damaging the structure of tissues or organs.

These ends may be more certainly attained by the judicious use of the preparations of mercury and iodine than by any other means; and this is the reason why these drugs hold their place in medicine as antisyphilitic specifics, notwithstanding the fact that the disease goes on and runs its full course in spite of their use, and notwithstanding the fact that much harm has doubtless been done with the drugs by their unskilful use.

Sigmund and Diday about twenty years ago made strong pleas for what might be called the hygienic and expectant treatment of syphilis when mild, believing that mercury did harm in such cases and that nature might be safely trusted to cope with them; yet even they in all severe cases founded their hopes upon mercury alone.

Zeissl,[1] in a studied essay, states that by observing the evolution of

[1] Wiener med. Zeitung, Nos. 1, 2, 3, and 4, 1879.

syphilis under the expectant treatment, he learned that the malady was atypical, seeming to depend, for the length of time it lasted and the severity of its symptoms, more upon the personal physical individuality of the patient than upon the treatment to which he was subjected. And there is a large measure of truth in this conclusion, and because of it a skilful advocate may justify all heresies of treatment and with equal ease condemn the most sound doctrine.

Some of the symptoms of syphilis disappear under the influence of intercurrent disorders. Thus, Mauriac has shown[1] that erysipelas exercises a curative influence over the cutaneous manifestations of syphilis. The eruption fades, that part over which the erysipelas has travelled getting well promptly, while the more distant lesions are slower in disappearing.

This is not more strange than the disappearance of cutaneous lesions not syphilitic, on the advent of some internal malady—tuberculous meningitis, typhoid fever, and others.

*The Hot Springs of Arkansas.*—These springs have acquired a widespread popularity, and some estimate of their value must be given. Some of the best physicians at the Springs state in so many words that there is no more virtue in that hot water than in other water equally heated. The water is very hot, so that it has to be reduced before patients can use it for drinking or bathing purposes. It is a clear, pure water, practically devoid of minerals, and is used upon some of the hotel tables, cold of course, as ordinary drinking-water. It is not exported, no one for a moment believing that the water, when cold, possesses any medicinal virtue whatsoever. Yet there is something about the heat that differs from the heat imparted to ordinary water by boiling it. Thus a bath taken in the spring water reduced to 98° F. will make the perspiration roll in drops from one's nose while lying in the bath—a phenomenon which will not occur when he takes a bath at 98° F. in his own bath-tub at home. Moreover, one may raise the temperature of the entire body (as shown by a thermometer in the mouth) by taking a foot-bath in Hot Springs' water; and he will fail to do this while taking a more prolonged foot-bath in much hotter water at home. The diuretic and diaphoretic qualities of the Hot Springs' water are also most marked—qualities both of which are lost when the water is allowed to cool. Furthermore, it is notorious and most obvious that one may absorb a vastly greater amount of mercury by inunction, the prevailing method at the Springs, than at home without inducing salivation; and even more strikingly a patient who at home, let him drink any amount of ordinary hot water, will revolt at three hundred grains of iodide of potassium a day and fail to find relief

[1] "Étude clinique sur l'Influence curative de l'Érysipèle dans la Syphilis." Paris, 1873.

from his severe tertiary symptoms, at the Springs, while drinking freely and bathing in the natural hot water, will digest one thousand grains a day with hardly a murmur, and consequently will see his symptoms promptly disappear.

It is this quality that gives value to the Hot Springs—a value which they certainly have.

A patient with chancre and early syphilis is no better off at the Hot Springs than he is anywhere else. He is rather worse off, because he is liable to be overtreated and to be deluded into a false security because his symptoms disappear quickly. His relapses occur just the same, and his malady lasts exactly as long whether he goes to the Hot Springs or not. He gains nothing. His treatment can be carried on just as well at home, and he avoids exposure to publicity and public criticism by staying at home.

It is only in the cachectic and in those whose tolerance of mercury is poor, or whose stomachs refuse to absorb enough iodide of potassium promptly to control their gummatous lesion—it is only in these cases that the Hot Springs lend valuable aid, and in such cases the aid is most valuable—so valuable that it would be a serious loss to the community were the Hot Springs to disappear from the face of the earth.

This same quality—namely, not directly affecting syphilis in the very minutest degree, but making the patient vastly more tolerant of mercury and iodide of potassium, which latter do the work—this same quality is possessed more or less by all hot springs having marked diuretic and diaphoretic properties whatever be their mineral constitution —and by the cave at Glenwood Springs as well—they greatly aid the patients to take mercury and iodide of potassium freely, an aid which has to be invoked for emergencies, but for emergencies only. No natural spring so far as heard from has any specific influence over the manifestations of syphilis, except locally to stimulate the granulation of chronic ulcers.

**Hygienic Treatment.**—The hygienic surroundings of a patient influence his general health, and upon the maintenance of good general health often depends the quality of the syphilitic symptoms in a given case. This remark is not absolutely true—indeed, probably no remark made about syphilis is absolutely true. Some old men, with broken vitality, in the decline of life, get syphilis, and have it in the very mildest form, while robust youths sometimes sink away promptly under a malignant onset of the disease. The activity of the poison in babyhood is well known, and that, too, not in cases of inherited syphilis alone. Epidemics of vaccinal syphilis clearly prove the virulence of acquired syphilis in the infant. Therein there are apparently certain diathetic or constitutional peculiarities of the individual which influence the quality of his syphilitic symptoms, and act independently of hygienic surroundings and of

everything else. This subject has been discussed in the section on Prognosis.

Therefore it cannot be absolutely said that hygiene, when good, will make syphilis mild, and when bad, will make it severe, for this is not the case. It is possible, however, I think, to make the following assertion with truth: that, other things being equal, the better the hygiene and dietetics the more creditably will the patient weather the storm, and the more certainly will his disease get well without materially damaging him. This assertion, of course, implies that, in addition to his hygiene and dietetics, the patient shall make use of intelligent therapeutics.

The hygiene of syphilis is that of common, every-day life. We no longer confine patients to their beds for the treatment of syphilis, or even to the house. The old notion, that it is such a serious matter for a patient taking mercury to catch cold, cannot be held in force. Surely it is wiser for a patient taking mercury not to catch cold, because the cold is likely to upset his stomach and to interfere with his treatment; but beyond this nothing is likely to happen, nor is it at all probable that a patient taking mercury in a mild, continuous way is any more likely to catch cold upon exposure than another under the same circumstances not taking mercury. Mercury may open the pores, as the popular notion is, for all that is known to the contrary. Mercury certainly is excreted in minute amounts by the skin, in the perspiration; but it means nothing to say that the pores are open—they undoubtedly always are open. Finally, to sum up, it may be confidently stated that a patient, while taking a mild, continuous course of mercury, may go out in the cold, the rain, and the storm, exactly in the same way as if he were not taking the drug, without being injured thereby.

Moreover, a cold taken in the active stage of syphilis may produce sore throat, and this sore throat, due primarily to cold, may be the occasion of a local outcrop of mucous patches and syphilitic ulcers in the throat, which may continue long and greatly annoy the patient, as well as possibly aggravate his disease by interfering with swallowing, and therefore with nutrition. An accidental sore throat may produce syphilitic symptoms in the throat just as smoking may, and just as a blister placed upon the skin, or a sulphur bath, may call out a syphilitic eruption upon a patient whose skin until then has remained clear.

Probably the best precautions against taking cold are the use of coarse bath mittens every morning upon the dry skin of the whole body, when there is no general eruption; soaking the feet, upon retiring at night, in cold water, washing the neck and chest in cold water in the morning, and not wrapping up the throat tightly while out of doors—as well as the avoidance of wet feet and draughts.

Cleanliness of the whole surface of the body by frequent bathing is very desirable during the whole continuance of the treatment. Of exer-

cise and air the patient should have an abundance. The function of the stomach and the intestine should be ministered to by appropriate food, and regularity as strict as possible should be observed in regard to meal-times and the hours of sleep.

As to the kind of food to be used, no special restrictions need be put upon the patient. He may eat what he chooses and what he knows will agree with him in full quantity, in ordinary health. There is no objection to the use of wine or beer in moderation with the meals, but any excess in alcohol in any shape is harmful, and drinking between meals should not be allowed. Many individuals do very much better if they observe total abstinence. Acids are considered harmful when mercury is being actively pushed—but only in such cases. When taking an ordinary mild, continuous course a patient may eat pickles and acid fruits—lemons—in all ordinary amounts without discomfort or disadvantage. When a patient is being crowded with mercury, acids may encourage salivation.

Under certain circumstances the regulation of food becomes very important, namely, when the medicine irritates the stomach so that it cannot be borne. The mercurials in any form, in some cases of weak digestion and irritable bowels, cause more or less griping and colicky pain, and the iodides often produce nausea and disability of the stomach. The mercury may be made to remain quietly in the intestine by the aid of opium, but it is far better to accomplish the same result, if possible, by means of a change of food.

When, therefore, moderate medication, such as may be necessary to keep down the symptoms, is found to produce pain and diarrhœa, all fruit and green vegetables must be denied the patient. He should take but little fluid of any sort. He should eat stale bread, tender meat, rice and boiled milk, eggs and toast, and by the exercise of these simple precautions he will often be able to continue his mercury and avoid opium. If another medicine must be given, it is well to commence with gr. x. doses of the subnitrate of bismuth; and if this serves to comfort the intestine, and keep pain and diarrhœa in check, it certainly is simpler and less apt to do harm than opium. The digestive disturbance will sometimes disappear when the form in which the mercury is administered is changed. Besides these means, it may sometimes be necessary to employ opium as well; but, if the opium can be avoided, it is to the patient's advantage.

The same general precaution in regard to diet may be employed when the iodides disagree. The subcarbonate of bismuth may be tried instead of the subnitrate in these cases.

The residence of the patient is not a matter of much importance, if his general health and his appetite remain fair, and his symptoms yield reasonable obedience to the medicines employed. Change of air, however, is always desirable occasionally, even for persons in ordinary good health, and this is the more necessary when the patient is laboring under

a devitalizing disease. Therefore, even if the course of the malady leaves nothing to be wished for, it is wise, for such patients as can afford the time and the money, to make a change of residence for a certain period of time each year, in the summer if they live in town, in the winter if their home be rural.

This change of air and surroundings becomes a matter of necessity in some cases, particularly in the later periods of the disease, if there be any tendency to cachexia. I have known patients, both early and late in the disease, who have failed to respond to medication until that medication has been supplemented by a change of air, when not only would the symptoms promptly mend, but the tone of the stomach would improve, and medicines which could not be taken at all without interfering with digestion could be borne without a murmur. This is particularly the case with the iodides.

In one case in mind this effect was strongly marked. The patient had a node which threatened to destroy the nasal bones. He could not take the iodides without having his stomach totally upset, while at the same time the iodides produced a brilliant crop of purpura on each occasion when they were tried. The patient was therefore sent to the country, with directions to continue his medicines there. A few days sufficed. He bore the drug well, his purpura disappeared, his stomach regained its tone, the node in his nose visibly diminished in size. He returned to the city, thinking himself safe; but a few days convinced him to the contrary: his stomach again refused food, his purpura returned, and he was obliged to go back to the country and to remain there until his node disappeared, which it promptly did.

The advantage patients in the cachectic stage of syphilis often derive from visits to springs, or to cities even, for the purpose of consulting some special physician about their disease, is no doubt sometimes due to the improved hygienic effect of their surroundings. This effect in New York City seems to last about six weeks, after which patients become used to the locality and fail any longer to improve in it—from the effect of climate alone.

*The hygiene of the mouth* is of the first importance in the treatment of syphilis. Mouth lesions and throat lesions form some of the most obstinate features of the disease, and these lesions are less apt to be severe when the mouth is kept clean and free from the contact of irritants. At the very beginning of syphilis, therefore, before the mercurial course is commenced, the patient should be sent to a dentist to have his teeth put in thorough order. All the tartar should be carefully scraped away from the necks of the teeth, and all old stumps extracted, and sharp projecting angles of teeth likely to come into contact with the tongue filed off. The patient should be instructed that he will do well to visit the dentist regularly every six months if the tartar tends to re-accumulate

quickly, as it does in some cases. During the whole of the treatment a very soft tooth brush should be used, for the stiff bristles of a hard brush cut and injure the gums, and make them more likely to become irritated under the influence of mercury than if a soft brush be used. Any tooth wash employed, or tooth powder, should be strongly alkaline and a little astringent. A good, simple tooth wash is made by putting half a teaspoonful or more of bicarbonate of soda into a glass of water, and adding a teaspoonful of tincture of myrrh. Ordinary white castile soap makes a good and simple tooth paste, and the mouth may be washed out afterward with some alum and water, or some tincture of krameria (ʒ i.) in aqua gaultheriæ (℥ iv.).

Smoking should be forbidden when mouth lesions persist and are troublesome. In some the mucous membranes are but little if at all involved, and such may smoke if they wish to, or even chew tobacco with impunity—it is totally a personal question.

A pipe is a dangerous thing for a patient with syphilis to use, for he runs the risk of infecting any friend who might use it, the secretions of mucous patches and syphilitic ulcers in the mouth being particularly contagious.

*The hygiene of the genitals and of the anus* is also important. These parts in both sexes should be kept scrupulously clean and dry, otherwise mucous patches and condylomata, excoriations and ulcerations, may be looked for. Should there be any tendency to moisture about these parts externally, they may be dusted with dry powders, talcum powder or bismuth, with or without a little calomel, after proper cleansing. It is well, in some cases, to have the patient wash the anus with soap and water after each action of the bowels. The umbilicus, also, in fat people, and the skin under the breasts in fat women, require frequent washing, drying, and dusting to preserve the parts in good condition during the eruptive period.

Medicines used in syphilitic cases, to keep up the general health or regulate the functions, come more justly under the head of hygiene than of specific medication.

All tonics find a fair field for their exercise in syphilitic subjects, and do good—not, perhaps, in curing the disease, but by holding the patient up while it works out its periods. The effect of mercury, when given in small doses for a long or for a short time, is undoubtedly tonic, as has been shown;[1] but it is not at all on account of this tonic action that mercury given in minute doses eliminates the syphilitic poison. Other drugs are far more tonic in their action, but, having no specific power over the symptoms of syphilis, they directly modify the disease but little, if at all. The only advantage claimed for the long-continued use of mercury

[1] "The Effect of Small Doses of Mercury," etc., Am. Journ. Med. Sci., January, 1876.

in minute doses is that, while acting in minute doses as a specific, it has the great advantage to the patient of being at the same time tonic.

Now, the ordinary tonics—such as the long list of vegetable bitters, the quinine group, iron, and analogous drugs, together with cod-liver oil and similar blood-formers—all of these serve a good part in the treatment of syphilis, just as other hygienic means do. If employed with intelligence and judiciously changed, they in a measure take the place of change of air and selection of food in those cases in which lack of money will not allow the patient to alter his food or to get a change of air. Cod-liver oil is a particularly useful adjuvant to treatment in those cases in which the blood-making powers are defective, while the ability to digest fat remains.

In persons who lack blood, yet in whom the stomach refuses to accept or to assimilate so concentrated a food as cod-liver oil, an excellent substitute is found in kumyss, buttermilk, zoolak, matzoon.

### Specific Treatment.

The specific treatment of syphilis is a treatment of the disease by those drugs which are known commonly to control the symptoms in an immediate manner. These drugs are the preparations of mercury and of iodine. The latter are found to exercise much less influence over the symptoms of early syphilis than mercury does; but, they possess a controlling power over many of the later manifestations of the disease, particularly those dependent upon gummatous deposit, no matter in what tissue such deposit occurs.

Mercury, on the other hand, has undoubted value in all stages of syphilis and over all its lesions, but less control over gummatous deposit than over other lesions. While sometimes it will (in form of fumigation) influence a gummatous lesion (ulcer, for example) more positively and more promptly than the iodides, yet, as a rule, it cannot be relied upon for this purpose. The iodides, in such cases, serve an excellent part to supplement the action of mercury. In treating a gumma, the object is to dissipate the deposit as promptly as possible, so as to save the tissues involved from damage by pressure, or by disintegration when they are included in the gummatous mass; and this the iodides do speedily if vigorously pushed and well borne by the stomach, while the mercurials will often fail to do it.

The iodides, on the other hand, have little or no power to prevent relapse; and, when they have done all their work, mercury often has to be called in to clinch the cure, and to prevent a return of the symptoms. Thus the two specifics support each other.

The senior author has demonstrated in two essays[1] that the red cells of

[1] "Effect of Small Doses of Mercury," etc., Am. Journ. of the Med. Sci., January, 1876, and "The Treatment of Syphilis," Philadelphia Med. Congress, 1876.

the blood are increased in number when mercury is used continuously in a certain way. Hence it is a tonic when so used, in spite of the protest from Germany that it does not act (as to the elimination of urea, the bodily temperature, etc.) just like iron, and in spite of the protest from New York that the hæmoglobin should have been quantitatively estimated also. Those interested in following the study of the blood and the course of argument derived from other facts which prove that mercury in minute doses long continued is a tonic, while in large doses it is atonic, diminishing the number of the red cells in the blood, are referred to the two papers in question. There it will be found to be demonstrated that mercury, properly used for a number of years in succession, cannot do any harm to a patient, while it certainly in most cases controls his symptoms in a greater or less degree. The years which have passed since the appearance of those papers have only served to strengthen the convictions as to the correctness of the conclusions there reached. The only modification made has been to increase somewhat the dose of mercury for continuous use.

Mouth symptoms during this course are generally more obstinate than any others, but the little scaly patches upon the tongue and lips may often be looked upon more as an evidence of local irritation in a person once syphilitic than anything else, and may often be succesfully treated locally without making any change in the internal dose which the patient may be taking at the time.

The coup-sur-coup plan of giving mercury is unsatisfactory, judged by the results in the way of relapses seen in patients who have so taken the drug at competent hands. The plan known as Fournier's treatment, which consists in the interrupted use of mercury in mild dose (a gentle coup-sur-coup method), with stated definite intervals in which no treatment is used, seems to rest upon no foundation stronger than theory, since syphilis, a malady of interruptions undoubtedly, has its interruptions at indefinite and irregular intervals. Notwithstanding that intervals of latency in the malady exist, periods of apparent immunity from the disease, yet there is nothing to prove that the patient is free from the poison during those intervals, but everything to show that he is still suffering. The cauterisatio provocatoria of Tarnowsky is founded upon this assumption. A blister or a local irritant (vaccination) will sometimes make latent syphilis active—a woman seemingly perfectly healthy will often produce a syphilitic child. What conclusion can therefore be reached except that syphilis is a mild, continuous disease, with periods of passive latency and period of active outbreak; and what treatment, therefore, recommends itself more to common sense than a mild, long-continued, uninterrupted treatment by a specific known to have power over the symptoms, with an increase in the quantity of that specific during the periods of outbreak?

And this becomes especially apparent when it can be shown, as has been done, that the continuous use of the mild specific acts as a general tonic (as well as performing its work as a specific) during the whole period of its administration.

The method indeed has all the advantage of the coup-sur-coup method, but its *coup* is mild. It hurts only the disease, never the patient. The "blow" falls only during the period of active outbreak of the disease, while the general treatment has the further advantage of acting continuously as a specific in eliminating the poison of syphilis and preventing it from causing outbreaks in the way of serious symptoms. This treatment constantly tends to keep the disease down, and to keep the patient up. It does not cure the disease so much as it conducts the patient safely through the periods of the disease. It does not prevent relapse later in life with certainty, for occasional cases of such relapse do certainly occur; but it insures one more positively against relapse than any other form of treatment—at least, than any other with which the authors are familiar.

Salivation is undoubtedly harmful. Much of the odium which rests upon mercury is due to the harm it has done to the mouths and stomachs of patients by salivation. In the days when it was considered that the patient never had arrived at his proper dose of mercury until he was caused to spit at least a pint in twenty-four hours, how much damage must have been done, and how justly has mercury paid the penalty by falling into popular disrepute!

That salivation becomes necessary in desperate conditions of disease late in syphilis is certain; but surely it has no value as a means of general treatment, and can never happen to a patient early in the disease without doing him positive harm.

The time when the general treatment of syphilis shall be commenced is a question of great importance. Unquestionably it should be commenced as soon as the disease is diagnosticated; but the difficulty is that diagnosis, before the eruptive stage—positively absolute diagnosis—is rarely possible without confrontation, and even then there is a chance for error found in the possibility of infection through another source, or in mediate contagion.

Practically, therefore, the treatment should not be commenced until the first general symptoms of syphilis appear; the chancre with the accompanying glandular engorgement is not enough to go by. If treatment be commenced while any doubt exists, that doubt remains, and the patient may continue in doubt for the rest of his life, to his great discomfort; therefore, although he may demand treatment, and beg for it when he has a chancre, the surgeon will do him a kindness by refusing internal specific measures until the first general symptoms begin to appear.

In the rare cases in which diagnosis can be positively made, without

the chance for the least possible doubt—as, for instance, when a husband poisons his wife or his child—treatment may and should be commenced at once without waiting for general symptoms; otherwise it is safer for all parties to wait. The patient's mind may be satisfied, meantime, by cutting out his chancre, and he may be medicated, to his advantage doubtless, with tonics of all kinds; but mercury should be denied him.

**Tonic Treatment by Mercury.**—The method about to be described is called the tonic treatment of syphilis, to distinguish it from other methods. It is tonic, and therefore the term is correct; but it does not cure syphilis because it is tonic. It cures the symptoms because it is a specific, and the tonic action is only an accidental one found to attach to the method. Even if it were not tonic, it would be proper to use mercury in the treatment of syphilis; and indeed, mercury often is given, and properly given, in such a way as to be a specific devoid of tonic properties, in that it is used in large doses—doses which have been shown by blood examinations to be anything but tonic. When, however, the specific medicine can be used so as to be at the same time a tonic, a step in advance over other methods is taken, and that is the reason why this method is called the "tonic treatment of syphilis."

The idea of this treatment is best carried out by using the same drug continuously in varying doses. If the preparation has to be changed and great accuracy is aimed at, it is necessary to make a new set of tests in order to find the tonic dose. The preparation which we have used the most is the protoiodide of mercury put up in France by Garnier et Lamoureux in the form of sugar-coated granules, containing exactly 1 cgm. each ($\frac{1}{6}$ of a grain).[1] The advantages of this preparation are that it does not change by climate; the protoiodide remains fresh inside the sugar coating, and the latter, being thin over the small granules, always dissolves in the stomach readily; the preparation is a solid one and easy to carry around, and to take without causing comment. The protoiodide has no special value over any other mercurial. The yellow iodide may be used—except that it is hard to find the tonic dose unless tablets of gr. $\frac{1}{6}$ – $\frac{1}{8}$, or smaller are used—because the pure yellow iodide causes colicky pain to many persons even in very small dose.

[1] There is a spurious granule sold which resembles the French granule outside, but if cut open discloses a nucleus of white sugar, which the true granule does not possess. This spurious article is a little stronger than the imported. It seems to contain more yellow iodide and less green. The true granule is anything but a pure drug. It contains the chemically pure yellow protoiodide, the impure green iodide, specks of red biniodide and globules of metallic mercury with a little free iodine under the sugar coating. It is not because the granule is a pure article that it is popular, but because it is uniformly impure, at least so its effects seem to prove, and it is weak, so weak that some patients do not seem to feel them at all—taking them in large numbers very freely. But on the other hand they rarely salivate and do not cause much abdominal pain and they are not dangerous for the patient to handle.

Small pills of the tannate of mercury, of gray powder, of blue mass, of bichloride may be used equally well, whichever form the physician is most accustomed to handle—always remembering that the individual pill or pellet must be a minute dose, if this form of treatment is to be strictly carried out. If the gray powder (mercury with chalk) is chosen a tablet of one-third or one-half a grain should be used in finding the tonic dose.

The blue mass pill with iron is a good one, the granule being made up of a quarter of a grain each of mercurial mass and of dried sulphate of iron—until the full dose and the tonic dose shall have been determined—or the bichloride of mercury may be used in tincture of the sesquichloride of iron; the dose being so regulated that one-fiftieth, or perhaps better, one-hundredth part of a grain of the bichloride shall be the standard dose until the tonic dose has been ascertained.

In short, any preparation or combination of mercury may be used, provided it does not contain opium, the addition of which would make it impossible to decide accurately what the tonic dose is. The standard dose must be a minute one.

The idea that the newer preparations of mercury are better than the old cannot be maintained, and no extra assistance is to be expected from such novelties as the carbolate of mercury, the thymolate, the benzoate, the formamide, the glycocoll, the alanate, and their kind.

To bring a patient under the tonic treatment, if there be time, the following is the best course: Let him take one standard dose of mercurial (one granule of the protoiodide, for example) after each meal for two or three days. On the fourth day one extra standard dose is added at the midday meal; now four standard doses (granules) are taken daily, and this is to be continued for three days.

On the succeeding fourth day another standard dose is added, the five daily standard doses being taken two in the morning, one at noon, and two at night. On the next following fourth day, always counting from the last fourth day, another dose is added, two standard doses being now taken after each meal—six (granules) a day.

In this way the amount of mercurial given is gradually increased, while the patient uses bland food in moderate quantity and regulates his habits as far as may be, and the dose is slowly increased every third or fourth day, or even every second day, if the patient be pushed for time and the presence of an eruption makes haste an object, until the irritating or the poisonous action of the drug begins to manifest itself.

If in any given case the symptoms are so pressing that there is not time to get the patient quietly under this treatment, there is no objection to treating him by any of the older methods until his symptoms abate. He may be rapidly brought under the mild influence of mercury until the drug shows faintly along the edge of the gums, either by inunction, by daily fumigations, or by corrosive chloride in tincture of bark, taken

diluted, after meals; and when finally the urgent symptom has fairly declined, all medication may be suspended for a week or more, and then under less pressure the mercurial course may be instituted as directed above.

One advantage of the French protoiodide granules, which was not alluded to above in the list of its virtues, is that, although it does not gripe when given in small quantities, yet it does show its irritating effects, usually upon the intestine, before it produces any trouble in the mouth. This is not always the case, but it is the rule; consequently, during this course of granules, diarrhœa and griping pain are to be watched for. A slight looseness of the bowels is unimportant. Such a looseness often comes on during the early days of the course; but, by holding the drug at the same dose, it subsides, and then the doses may be increased as before.

When a dose of six to nine, or even twelve granules a day in some cases, has been reached, it will produce a very positive attack of diarrhœa, with pain in the intestines; and occasionally at the same time the breath will begin to have the mercurial fetor, and the livid line will begin to show faintly along the edge of the gums at the necks of the teeth, while the teeth themselves become a little sensitive on being snapped sharply together, and the saliva flows more freely. These latter symptoms are generally not much marked with the protoiodide, and they may be absent entirely while the griping and diarrhœa are quite positive, and this feature is an advantage in favor of the protoiodide.

When either of these sets of symptoms occurs, the patient has reached his limit. He is taking what is called his "full dose"—a dose which he may continue to take with the aid of selected food and a little opium, and may indeed, in most cases, continue to take without becoming salivated. This dose is anything but tonic. If it be continued, the patient surely suffers in time, both in the stomach and in the quality of his blood, while his strength and physical powers are diminished by it. This "full dose," therefore, is to be used only in case of necessity. It is specific, and possesses fully the antagonistic influence to syphilis which the mercurials enjoy; and the patient may take this dose for a considerable period without injury, if his symptoms require it, with the aid of a little opium to give him comfort, or preferably without opium, by changing his food, drinking boiled milk, and eating rice.

This "full dose," the size of which varies greatly in different individuals, may be maintained until the activity of any existing symptoms declines, and then it should be dropped and the "tonic dose" of mercury substituted.

One-half of the "full dose" is a "tonic dose," and may be continued steadily during several years without injury to the patient; if anything, apparently rather to his advantage, for he feels well under it in most

cases, he eats well, his functions go on perfectly, and his blood is richer in red corpuscles than it was before. The condition is an unnatural one, however. Nature is being outraged by the constant use of a foreign substance, which is allowable only in order that it may counteract another foreign substance—the poison of syphilis—and the less of the drug that can be used with safety to the patient the better. Therefore it is sometimes as well to employ as a continuous dose a quantity somewhat smaller than the regular tonic dose—a quantity, for instance, equal to one-third instead of one-half of the "full dose" in the second six months of the disease when the symptoms are well under control. This dose is also tonic, and with it one may persist without interruption, for a long period of time, in the endeavor to eliminate the syphilitic poison gently, and to keep its explosive outbreaks within reasonable limits. The idea of the tonic dose is that it shall be continued daily, year in and year out, for, in round numbers, about two years for mild cases and longer for severe ones—alterations, of course, being occasionally made meantime, according to the varied necessity of the different cases.

During the existence of all ordinary moderate symptoms, isolated patches of eruption, disappearing general eruptions, mucous patches, etc., the tonic dose may be maintained unvaried, or slightly increased, according to the surgeon's judgment, while local measures are brought to bear upon the local lesions. If more severe symptoms come on at any time, the tonic dose may be immediately increased to the full dose, already ascertained; and after the full dose shall have done its work, it in turn may be again dropped to be replaced by the tonic dose. In these emergencies, instead of increasing up to the full dose, the tonic dose may be maintained, and inunction or fumigation or one of the other internal mercurial preparations in full dosage resorted to until the emergency shall have passed.

These simple directions meet the wants of most cases until some tertiary symptom arrives—if, indeed, any tertiary symptoms come on at all, for they may be escaped. Tertiary symptoms call for a variation in the general treatment. The mercury may be dropped entirely, one of the iodides being substituted if the lesion be purely gummatous; or the mixed treatment may be called for according to the symptom. Under the heads of the various symptoms, it will be indicated which of the special forms of treatment is required. When the mixed treatment is indicated, one of the best combinations is the biniodide of mercury in a solution of the iodide of potassium.

After the mixed treatment or the iodides alone shall have accomplished what was expected of them, it is well that the patient should return again to his tonic dose of the granules, and continue them until it is thought best to stop all treatment.

In case of any intercurrent malady not syphilitic in nature coming on

during a long mercurial course, the latter may be stopped at once and resumed when the intercurrent malady has passed away. The mercury should be stopped also during any attack of acute indigestion, diarrhœa, and the like.

A special method of giving mercury internally is the plan known as Trousseau's which is worthy of note. By this plan minute doses of calomel, anywhere from gr. $\frac{1}{60}$ to $\frac{1}{10}$, are given hourly or at short intervals, with great effect in some cases in overcoming the intense headache of early syphilis, and for the purpose of rapidly bringing a patient under the full influence of mercury. One-tenth of a grain hourly will show in the mouth, in the case of some patients, within twenty-four hours, and will often purge.

The time at which a tonic course of the mercurial specific may be stopped is subject to variation. About two and one-half years is a full course for most people, while two years answers well enough in some cases. Six months of entire immunity from symptoms, at the very least, or, better still, a year's freedom from evidences of the disease, is desirable before the tonic treatment is stopped. In some cases in which smoking is persisted in, an occasional scaly patch on the side or tip of the tongue, or inside the lips or cheeks, need not be regarded as a symptom serious enough to make the six months' test invalid. It is better that no symptom whatsoever suggesting syphilis should have occurred; but it becomes a matter of special judgment in some cases whether the persistence of these mild mouth lesions, for cause (smoking), may not be disregarded, provided there is and has been nothing else about the patient for a long time to suggest the persistence of the existence of syphilis. Occasionally, non-syphilitic patients are found in whom smoking will produce erosions and scaly patches within the mouth absolutely identical with the lesions found in syphilis. Should such a patient get the disease, it is not fair to let his constitutional peculiarities be ascribed to a syphilitic cause.

If relapses occur after the cessation of treatment, they must be managed according to their necessities, generally best by the mixed treatment; and then, finally, a tonic mercurial course may be instituted for a few months, more or less, according to the judgment of the surgeon, and proportionate to the intensity of the relapse and its obstinacy.

Many patients will not follow continuously the strict course which has been detailed; but many others do follow it conscientiously, the more readily as they are intelligent and have the nature of the disease explained to them, together with the theory of the treatment.

**Mercurial Fumigation.**—Before making use of the standard dose, in order to find the full dose and the tonic dose in a particular case; or, after the tonic dose has been ascertained and when it is desirable suddenly to increase the mercurial influence in order to counteract some tendency to activity on the part of the syphilitic symptoms—instead of putting the

patient upon his full dose of mercury, he may be retained at the tonic dose, and the mild but certain influence of mercurial fumigation brought to bear upon him.

Mercury in vapor acts very promptly and very kindly. The obstacles to its extended use are the difficulty of its application, the time required to give a bath, the impossibility of using it secretly at home (for syphilitic patients are always shy of being discovered while taking medicine), and the expense if the baths are taken in an outside establishment.

The value of the vapor, however, is so considerable in many cases that its use for emergencies should be placed within the reach of all. In many ulcerated and pustular lesions, and in cases in which persistent and chronic relapse occurs in a patient with irritable stomach and general debility, the vapor bath renders invaluable service. When pushed too far, mercurial vapor may cause salivation or diarrhœa, but it rarely does so when watched; a sense of weakness, with general depression, attended by more or less trembling (perhaps positive mercurial tremor), is one of the more common indications that the baths are being pushed too rapidly.

In a regular mercurial bathing establishment, the patient sits naked in a box, sometimes with the head in (if the fumes are not disagreeable and do not induce coughing), sometimes with the head out. A little steam is let into the chamber, the temperature is raised to 90° F. or thereabouts, and when the body is damp and warm the mercurial to be used is volatilized, and, permeating the chamber, settles upon the moist skin, where it becomes precipitated—changed probably into the bichloride by contact with the perspiration, and as such absorbed. If the head is in the fumigating chamber, a certain amount of the vapor is directly absorbed by the lungs.

Fifteen to twenty minutes is ample time for such a bath, which should be terminated sooner if the patient grows faint. The best form of mercurial for the bath I believe to be the black oxide, in a dose for volatilization at first of one drachm, afterward of two drachms. Calomel is often used, and the sulphuret of mercury in doses of ʒ i.; but both of these substances irritate the lungs of some patients and may induce violent coughing. When they are used, therefore, the head should be kept outside the fumigating chamber.

Twice a week is generally often enough to repeat the bath. In some cases, where they are well borne, I have repeated them daily for a time, watching the patient carefully for the effect of mercury.

After the bath the patient should wrap himself up in a warm blanket, and rest quietly for an hour or more, until he has become thoroughly dry without the use of a towel.

*Domestic Vapor Baths.*—The form of bath above described is a good one, but it is an expensive luxury, and not to be obtained at all by patients in the country. Under circumstances calling for a bath, in which

the bathing establishment may not be suitable, an excellent substitute, answering all purposes, may be taken by the patient in his own house at a merely nominal cost. The appropriate essentials for such a bath are: an alcohol lamp with one or two good burners, and a piece of tin bent into the form of a table (Fig. 85), of such height that the flame will spread itself evenly upon the under surface of the tin. The figure represents the flames of the lamp as being by far too small. We have found upon

FIG. 85.

such a table that one good flame of a spirit lamp will volatilize half a drachm of calomel in four and one-half minutes, and the same amount of cinnabar in six minutes. One flame is therefore ample, and it need not be a very large flame if the sheet of tin be reasonably thin.

Both calomel and cinnabar volatilize quite easily by this method; the oxides require more heat and more time. Gray powder may also be used. Both calomel and cinnabar (and especially the latter) may cause coughing, but generally the bath can be so managed that the patient is not materially discomforted by it. If cinnabar be used, the patient may keep his head out, and retire into another room immediately after the bath. On the whole calomel is to be preferred in this form of bath, commencing by volatilizing a powder of twenty grains, and working up to a drachm.

The simple method of taking the bath is as follows: the patient sits naked on a cane-bottomed chair, holding close around his neck, under his chin, a couple of blankets, which may be pinned in place so as to envelop the patient and the whole chair down to the floor. Under the blanket is placed the little tin table beneath the chair, with its spirit lamp unlighted, the dose of calomel lying on top of the tin table. Under the chair, also, is placed a pan of hot water.

The patient sits quietly over the hot water until his skin has become warmed up and slightly moist, then he stoops down, lights a match, lifts the edge of the blanket, and lights the spirit lamp. He may leave this light burning until the bath is finished if he desires, or he may extinguish it in five or ten minutes, according to the amount of calomel to be volatilized and the degree of heat he experiences. He then sits quietly for perhaps ten minutes longer in the fumes, occasionally opening the

front of the blankets to breathe a whiff, if the vapor does not irritate the air passages. He now wraps himself up in the inside blanket in which he has taken his bath, and remains so wrapped, lying down until he has cooled off, after which, without using a towel, he goes to bed. In the morning he may take a soap and warm-water bath.

The effects of mercurial vapor by inhalation may be obtained when a patient is unable to leave his bed by volatilizing calomel or cinnabar near his nose upon a sheet of tin, or even upon a hot brick. Inhalations of this sort are of incalculable value in some cases of mouth and throat lesions, when the patient can make the inhalations without coughing, which he generally can do if they are commenced mildly and often repeated, minute quantities of mercury being volatilized at a time.

**Mercurial Inunctions.**—Inunction is the best method of introducing mercury into the bodies of infants, and many believe that it is the best method in the adult. The main objections to it are that it is dirty, and so irritates the integument in some cases that it cannot be used for any great length of time. When it agrees it is an excellent method, especially to use in conjunction with the tonic internal treatment, to meet such emergencies as call for an increase in the amount of the mercurial employed. It is as good a method as that by fumigation for sparing the stomach, and is very useful in those cases in which that organ must be restricted to its natural function, the digestion of food.

There are many methods by which mercury may be introduced through the skin into the blood. Ordinarily the process is one of friction; and the patient may do the rubbing himself with his own bare hand or it is done by a professional rubber, who sometimes wears gloves.

The amount of absorption which takes place by the skin is very variable in different individuals. A prompt effect is produced in some patients, a very slow effect in others; consequently, when the course must be long or the dose at all accurate, this method is obviously inappropriate. Moreover, skins differ materially in their irritability upon the contact of mercurial preparations. Some patients will wear a patch of mercurial ointment bound upon the skin for weeks without showing any local redness of the skin, while in others each inunction is followed by local redness and itching, and a persistence of the application by an outcrop of the so-called mercurial eczema which distresses the patient considerably by its itching, and is, relatively, quite chronic in character and slow to disappear.

In the friction method of inunction two preparations are in use: mercurial ointment and mercurial vasogen. Of the two the mercurial ointment is cheap, most easily procured, and generally preferred. It gives satisfaction, and the common ointment if freshly made is perfectly reliable. There are many special preparations which are perfectly good, doubtless better than the common ointment, but the latter if fresh serves

all purposes. Among the better preparations may be mentioned sterilized ointment put up in gelatin capsules, two and a half and five grams in a capsule, and ointments made with lanolin—to facilitate absorption. The mercurial vasogen is a new proprietary preparation made in varying percentages, and alleged to be capable of quick absorption. A moderate acquaintance with it seems to justify the claim. It is put up in capsules, 33 and 50 per cent strong, two and three grams each, one of which is to be rubbed in by the patient each day. If it really has unusual merit it will remain; otherwise it will shortly follow the oleates of mercury and be forgotten.

When mercurial ointment is to be rubbed in, from half a drachm to a drachm is a dose, to be used once daily, preferably at night. The skin to be anointed should be thin, for the absorption of mercurial ointment is not active; therefore, the flexures of the various joints are usually chosen, although any part of the integument will answer. The lateral abdominal regions when not hairy are suitable regions and convenient for the patient.

The portion chosen for inunction is to be slowly and firmly rubbed with the ointment by means of the bare fingers or the whole hand, for something like twenty minutes or half an hour. The task is laborious if properly done. The vasogen preparation is said to require a shorter period to obtain absorption. After rubbing the ointment in as thoroughly as possible, the part may be bound up in dry flannel and left for twenty-four hours, when it should be carefully washed with soap and warm water, and another friction performed upon another portion of the integument.

The best inunction method when conducted by a masseur is the following; it is practically what is done at the Hot Springs: The patient straddles a chair, leaning his arms and chin upon the back of the chair. He is in a warm room, naked from the waist upward. The rubber taking one-eighth, one-sixth, sometimes one-quarter of an ounce of mercurial ointment, rubs it broadly over the whole back with a long sweeping, circular motion, and in this way going round and round, rubs the ointment thoroughly into the pores of the skin for about twenty minutes. The patient now puts on a thin gauze undershirt, his mercurial shirt, which he wears through the entire course, and goes about his business. On the following day, about two hours before the time for his second rubbing, his attendant gives him a warm soap and water bath, thoroughly cleansing the back. Then the skin is rubbed down with alcohol and clean underclothing put on, the skin being allowed to rest for about two hours. Then another inunction is given and the original mercurial shirt again put on.

Teale's method of inunction, as it is called, consists in binding upon an arm or a leg a piece of bandage (or flannel cloth), upon which mercu-

rial ointment has been thickly smeared. The bandage is kept in place at discretion, the surface of the skin beneath it being inspected daily, and the bandage removed and placed elsewhere when the skin begins to show any signs of redness, or the patient complains of local itching. By this means there is a continuous action of the mercury upon the skin day and night until the ointment dries up, when it must be freshened with oil or a new plaster applied.

This method is mild and continuous in its action, and with certain skins works admirably.

**Hypodermatic Treatment.**—The only other method of introducing mercury into the body which is worthy of consideration is that by intra-muscular injection, and when prompt effect is aimed at, one that shall be lasting and searching, this method is perhaps the best of all. We keep it constantly in mind for emergencies. The objections to it are, that it is often painful, may possibly suppurate, but out of several thousand injections made by the authors only two abscesses are of record; and, it must be borne in mind, an occasional fatal issue has been recorded after intra-muscular mercurial injection, due to venous thrombosis at the seat of puncture and pulmonary embolic infarction. The authors have never encountered a case, but such cases have occurred at very long intervals in the best hands.

The preparation used for hypodermatic medication is either a soluble or insoluble mercurial. The soluble preparations may be represented by the bichloride of mercury, the insoluble by the mild chloride or calomel. The objections to the bichloride are that it irritates sharply and like all the soluble preparations, being eliminated rapidly, must be employed at too frequent intervals. Calomel has been abandoned on account of its proneness to produce abscess.

The preparation we have adopted and used constantly for many years is an insoluble one, the salicylate of mercury. It is prepared by mixing twenty-four grains in one ounce of sterilized benzoinol. The salicylate precipitates and must be mechanically mixed by violently shaking the bottle each time, and an extra large hypodermatic needle must be employed—one and one-quarter inches long and with large calibre, that it may escape clogging with the insoluble particles. We use a syringe with an asbestos piston, which may be boiled and kept surgically clean. The injection is to be made in the upper and outer part of the buttock, the needle being plunged in its entire length and the fluid injected slowly. The injection must be made aseptically and the little puncture closed with a bit of adhesive plaster. We use thirty minims of this mixture usually at one injection, one and one-half grains salicylate of mercury, twice a week, later once a week. The effect is often amazingly prompt and lasting, and so obvious that patients soon learn to put up with the discomforts of the course rather than forego the advantages. In the late patches of scaling

palmar and plantar syphilide, so obstinate to almost all forms of internal medication, these injections work wonders.

The direct local influence of mercury is proven by subcutaneous injection of the drug, since it is found that when a patch of eruption is injected, it gets well, while a similar patch, more or less distantly situated, is not modified by the general effect upon the system of the small amount of mercury employed.

**Salivation.**—In a properly regulated treatment salivation should never occur. In ascertaining what the "full dose" of mercury is in a given case, the gums may be touched, as the expression is; but this condition cannot fairly be called salivation, although it is the first stage of it. In maintaining the full dose, the mouth is kept constantly in a condition of mild irritation, and necessarily so, in some instances, when the symptoms are severe. Under these circumstances, especially if it seems probable that the full dose will have to be maintained for a considerable period, certain precautions should be taken with the mouth in order to allow the mercury full chance without in any way encouraging its disagreeable effect upon the mouth.

The teeth, it is presumed, have been properly attended to, and the tartar removed by a dentist. All the precautions detailed in speaking of the hygiene of the mouth should also be put in force. Besides these, three other precautions may be resorted to; they are: the bath, a diuretic, and the internal use of the chlorate of potassium.

The bath should be used quite hot at night, and the patient advised to remain for a number of minutes in the warm water. Then he should dry his skin under very smart friction with a soft towel. In this way the circulation of the skin is rendered active, and the dead epidermis rolled off in quantities by the friction. The function of the skin as an excretory organ is intensified, and more mercury than usual escapes in this direction, taking off some of the work from the mouth.

A diuretic acts in the same way, increasing the excretory activity of the kidney, and allowing more mercury to escape from the body by this channel.

Finally, the well-known soothing influence of the chlorate upon the irritated mouth and fauces should be called into play. A little less than a drachm of the chlorate of potassium in twenty-four hours is generally enough.

℞ Potass. chlorat., . . . . . ʒ i.
Aquæ gaultheriæ, . . . . . ℥ iij.
M. S. Teaspoonful hourly in a tablespoonful of flaxseed tea.

As salivation approaches, the stale odor of the breath becomes positively offensive, quite peculiar and characteristic—the mercurial fetor, as it is called. The tongue becomes heavily coated, and the peculiar, bitter, coppery taste of which the patient has been complaining grows sensibly

more intense and more disagreeable, especially upon awakening in the morning. The gums grow puffy, soft, and fungating along the line of the necks of the teeth, more livid in color, bleeding easily upon the lightest touch, as during brushing the teeth, even with the softest tooth-brush. Finally, the flow of saliva grows more and more profuse, partly watery and partly tenacious. It flows over upon the patient's chin, and soils his clothes. At night it runs out from the angles of his mouth, and wets his pillow. With these signs the stomach is often badly upset, diarrhœa comes on, the complexion becomes pallid, livid, the appetite fails, and headache is often present, with great depression of spirits.

At last the tongue may swell so as to be too large for the mouth, and with it the lips and cheeks become tumid. Ulcers appear all over the inside of the mouth and along the gums. The purple gums bleed freely, the loosened teeth project and drop from their sockets, while more or less extensive portions of bone, or of the soft parts, necrose and slough away.

Such an intense condition of salivation as that last depicted is very rarely encountered at the present day, but it need not be waited for; all conditions of active salivation demand prompt measures for their relief.

All the means of relief already detailed under the head of hygiene of the mouth, and directed for the restraint of salivation when the gums are mildly touched, should be kept in force, as far as may be, and atropine used in solution under the skin.

No one remedy perhaps acts as kindly as this. Of the following solution—

℞ Atropinæ sulph., . . . . . gr. i.
Aquæ, . . . . . ℥ i.
M.

Five minims may be thrown under the skin, the effect upon the pupil being watched, and the dose repeated every four to six hours until the pupils are widely dilated.

Chlorate of potassium in solution, in cold tea, about one or two drachms to the pint, with a scruple of carbolic acid, according to the sensitiveness of the swollen mouth, should be constantly used as a mouth wash, and gradually, as they can be borne, stronger and more astringent washes. To all of these a little carbolic acid should be added, for the mouth and its secretions are most foul and need sweetening greatly. A reasonably good mouth wash is the following, diluted at first with warm water, should it prove too astringent:

℞ Acid. carbolic., . . . . . gr. x.
Acid. tannic., . . . . . ʒ i.
Tr. myrrhæ, . . . . . ʒ ij.
Potass. chloratis, . . . . . ʒ ij.
Mellis, . . . . . ℥ ij.
Aquæ menth. pip., . . . . . q.s. ad ℥ viij.

Peroxide of hydrogen diluted, or a mild solution of borax or of permanganate of potassium, may be used as a substitute for the carbolic-acid preparations should the latter be offensive, as they are to some patients.

Diarrhœa in these cases may be disregarded, unless it is exceptionally severe. Nourishment must be maintained mainly by milk, eggs, soups, and soft food. The patient should drink water freely.

**Local Treatment.**—The local treatment of syphilis, although subordinate to the general treatment, is nevertheless of great importance in many cases. This is especially true in regard to mouth lesions, and those occurring about the anus and genitals in either sex. It may also be required for æsthetic purposes to remove eruption that shows upon the face, scalp, or hands, and to assist in cicatrizing ulcerated areas.

In connection with a description of the varied local lesions, some of the local measures of treatment most appropriate to them will be alluded to; but, for the sake of avoiding endless repetition, it is well to group under one head all general remarks about the local treatment of the varied lesions of syphilis, only repeating afterward when the treatment is to be emphasized.

In general, then, it may be said that all the local expressions of syphilis should be treated with respect, not irritated by much handling, by dirt, by allowing the secretions to be retained and to undergo decomposition. Ulcers should be kept clean, discharges of all sorts should be frequently washed away, tobacco prohibited when mouth lesions exist.

*Lesions Upon the Skin.*—The local treatment of chancre is detailed along with the description of the lesion. The early general eruptions require no local treatment other than cleanliness, unless it be for such portions of the eruption as appear upon the face and hands. These portions, therefore, may be treated topically while the rest of the eruption is allowed to subside under general medication.

The best topical applications for all the forms of secondary and intermediary syphilis appearing upon the skin are the different preparations of mercury. Most of the tertiary lesions do well also under a local use of the mercurials; but some ulcerative forms seem to thrive better when dressed with iodoform, nosophen, or aristol.

The mercurials, to be effective of good by local application, should be graded in strength so as to stimulate without irritating the surface. Consequently there must be a range in the strength of all applications employed, and it is well in a given case to begin with a mild ointment, increasing its strength according to its effect. Dry lesions call for more strength in the local application than excoriated surfaces require.

The preparations from which have been derived the most service are the following:[1]

[1] Most of these have appeared in the monograph on "Tonic Treatment of Syphilis," E. L. Keyes, published in 1896, p. 71.

℞ Hydrarg. oleat., . . . . . 5–10 per cent.

Or—

℞ Hydrarg. chlorid. corrosiv., . . . . . gr. i.–v.
Glycerinæ, . . . . . ʒ ss.
Spts. rect.,
Aquæ ros., . . . . . āā ℥ ss.
M.

Or—

℞ Hydrarg. chlorid. mitis, . . . . . ʒ i.–ij.
Ungt. aquæ ros.[1] . . . . . ℥ i.
M.

Or—

℞ Hydrarg. ammoniat., . . . . . ʒ i.–ij.
Ungt. aquæ ros., . . . . . ℥ i.
M.

Or—

℞ Hydrarg. oxid. rub., . . . . . ʒ ss.–ij.
Ungt. aquæ ros., . . . . . ℥ i.
M.

Or—

℞ Ung. hydrarg. nitratis, . . . . . q.s.
To be used in the beginning much diluted.

Or—

℞ Hydrarg. iodid. virid., . . . . . gr. xv.–l.
Ungt. aquæ ros., . . . . . ʒ i.
M.

Or—

℞ Hydrarg. oxid. flav., . . . . . gr. xx.–ʒ iss.
Ungt. aquæ ros., . . . . . ʒ i.
M.

Among these preparations, perhaps the best are the lotion of the bichloride, the white precipitate, and the citrine ointments. One or the other of them will be found to serve a good purpose in the case of the different cutaneous lesions, dry or moist.

*Ulcerated lesions* upon the integument, due to late syphilis, generally improve under various local mercurial applications. The black and yellow washes of the pharmacopœia serve a good purpose, as does also a mild solution of the bichloride of mercury, or dusting the surface with calomel.

Gummatous and serpiginous ulcers sometimes improve under these applications, but sometimes they do not. In such case it is well to try iodoform in fine powder, or rubbed up into a paste with glycerin, or dissolved in chloroform, remembering that the chloroform solution is sometimes a painful application.

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[1] Any other bland excipient may be used. Vaseline is perhaps the best if the ointment is to be kept for any length of time, since it does not become rancid. Ointments made with vaseline, however, are somewhat less active than if another fat is used as an excipient, and absorption is more prompt if lanolin be used.

A watery solution of chloral hydrate does very well in some old, sluggish cases, from gr. v. to xv. to the ounce of water.

Ulcers on the leg, if old and chronic, often improve at once upon the use of Martin's rubber bandage, or any other species of strapping, while some phagedenic forms of ulcer ought to be allowed the chance of benefit promised by the continuous submersion system described on p. 191. Chronic syphilitic ulcers with hard edges do well if their edges are scarified and poulticed at first. Ulcers communicating with necrosed or carious bone, or with sinuses leading into joints, cannot be expected to get well until the deeper-seated lesions have been overcome.

*Lesions upon the Mucous Membranes.* — Great cleanliness is the first requisite in treating syphilitic lesions of mucous membranes. The mouth must be subjected to all the rules mentioned in connection with the hygiene of the mouth, and astringent mouth washes, as well as some of the other measures suggested in cases of salivation (p. 191), may do good. Tobacco must be stopped in the case of mouth lesions; the vagina and vulva should be syringed and washed frequently in the event of lesions in this quarter; constipation must be avoided, and cleanliness enjoined whenever the rectum is threatened with trouble or becomes the actual seat of lesions.

*Mouth lesions* are the most common and most likely to be protracted. Steaming the throat and mouth, gargles of peroxide of hydrogen, of infusion of flaxseed, of warm tea, with or without a little borax, gr. x.–xx. to ℥ i., or chlorate of potassium, gr. v.–xv. to ℥ i., have an excellent soothing effect in these cases. A certain amount of chlorate of potassium should be swallowed, that, by returning into the mouth in solution in the saliva, it may keep up a constant, mild, soothing action upon the various lesions.

One excellent expedient, in cases in which mouth lesions are constantly recurring, is to give whatever mercury may be required for general treatment in the form of tablet triturates of bichloride of mercury, which may be allowed to dissolve slowly in the mouth, the saliva being swallowed. In this way the local effect of a solution of corrosive sublimate upon the mouth lesions is obtained at the same time with the carrying out of general treatment.

The best local applications to make upon syphilitic mouth lesions are solutions of corrosive chloride of mercury.

℞ Hydrarg. chlorid. corrosiv., . . . . . gr. ij.–v.
Spts. rect., . . . . . ʒ i.
M.

To be painted over the affected surfaces with a soft brush daily.

Or, the acid nitrate of mercury, pure, in small quantity, touched upon the lesion once a week;

Or, applications of the nitrate of silver, or of the nitrate of zinc, solid or in solutions of varying strengths;

Or, the daily use of a solid lump of pure sulphate of copper, which is to be lightly rubbed over the lesion.

Mercurial fumigations (p. 240) are of the utmost value in many forms of mouth lesion.

In cases of pure gummata of the mouth and throat, it is best not to waste time with mercurial local applications, since attention in this way may be diverted from the main hope in such cases—the unsparing use of the iodide of potassium internally.

Upon the vulva, vagina, beneath the prepuce, and elsewhere, the same general line of treatment is to be followed as for similar lesions within the mouth—cleanliness being perhaps of more value than any other one local method of treatment. Pedunculated condylomata, or other vegetations, may be snipped off and the base from which they grow cauterized, or they may be treated with the salicylic acid and acetic acid compound (page 59).

*Mucous patches* about the angles of the mouth, upon the lips and face, generally do well under the local application of the solution of the bichloride of mercury. If this does not hurry them away, one or two light applications of the acid nitrate of mercury usually leave nothing to be desired in the way of efficiency.

When mucous patches occur about the anus, under the foreskin, on the sides of the scrotum, or about the vulva, between the toes, under the breast in the female, in any region where overlying portions of the skin keep the surfaces of the lesions sodden, retain their secretion, and encourage putridity of the moisture as it collects—in any of these contingencies, soap and warm water, followed by a mild dilution of Labarraque's solution, of permananate of potassium, or of carbolic acid, are great aids to treatment.

The lesions must also be kept dry, if possible, either by interposing layers of thin old linen, absorbent cotton, or prepared lint, between the surfaces which lie in contact, or by a plentiful use of some absorbent powder, such as talcum, bismuth, oxide of zinc. A very effective way of treating these lesions is to dust them plentifully and often with pure calomel, or with calomel in varying proportions combined with one of the inert dry powders mentioned above.

All that is required besides this, even in bad cases, is to touch the separate moist lesions with solutions of nitrate of silver of varying strength, gr. x.–ʒ i. to the ounce of water; or lightly with the solid stick of lunar caustic; or, perhaps better still, to use the solution of the bichloride of mercury already recommended for skin lesions.

# CHAPTER IX.

## THE GENERAL TREATMENT OF SYPHILIS (*Continued*).

**The Iodide Preparations.**—For the purely gummatous lesions no drugs equal the iodides given unsparingly. Unfortunately, the popular dislike to mercury is shared by many physicians; and these gentlemen, in looking around for a specific for syphilis which is not mercury, often fall upon the iodides and administer them in different vegetable infusions and tinctures from the very beginning of syphilis, praising themselves and calling for the applause of their patients in that they give no mercury. It is better, doubtless, to treat early syphilis with iodide of potassium than not to treat it at all; but exactly how much better, it is hard to estimate. The iodides have little power in postponing eruptions that are to come, although they do clear up existing lesions. They certainly have little or no power in preventing relapse either early or late in the disease. The iodides have their place, and a very important place it is; but it is unfortunate that they are accredited with much curative power over syphilis, since this notion naturally leads to their abuse, and tends to bring them into disrepute.

Whenever the lesion is gummatous, in most of the intermediary and late syphilides, and whenever the proliferative changes of connective tissue so common in advanced syphilis in the internal organs are going on, the iodide of potassium is a power, and an enormous power, which may be used to the great advantage of the patient, either alone in very large doses in appropriately selected cases, or in combination with mercury, in more moderate doses—constituting what is known as the *mixed treatment.*

When, however, the symptoms for which the iodide is used have been fairly and entirely overcome, then the mercurials resume sway, and it is better shortly to drop the iodides, holding them in reserve for other emergencies.

The preparations of iodine most valuable in syphilis are the iodides of potassium and of sodium. The iodides of calcium, starch, and ammonium are also used, and iodine as tincture, simple and compound, and in the shape of iodoform internally. The last may be spoken of first, in order to dispose of them.

Little or no iodine effect can be expected from iodoform internally,

given in doses of a fraction of a grain up to five grains at a time. Hill has spoken well of it in gumma of the tongue, but we have not found it serviceable. The senior author has given thirty grains at a dose, with no obvious effect.

The tincture of iodine and the compound tincture in starch water (forming the fresh iodide of starch) may sometimes be used with advantage. It is very dark to look at, and not pleasant to the taste, being flat, rather nauseating than otherwise; but it is, on the whole, bland and rather easily digested, and in cases in which the iodide of potassium or sodium was badly borne by the stomach the mixture has value. The tinctures may be used in doses of ten drops in a tablespoonful or more of starch water, and increased up to eighty drops in a claret-glass of the diluting fluid. The iodide of starch in the form of a dry powder may be used in from gr. x. to xxx. doses. It is very bulky and difficult to take. The iodide of starch cannot be relied upon in an emergency. It is valuable mainly in some chronic conditions and as an alternate to other iodides.

The iodide of ammonium is generally used in combination with other iodides, under the idea advanced by Paget and sustained by Hutchinson, that the carbonate of ammonia given in combination with the iodide of potassium intensified the action of the latter.

The iodides of potassium and of sodium and of strontium hold the first rank among the preparations of iodine as specifics against syphilitic gummata. Of these the first named is the most powerful, but it has the disadvantage of being decidedly more irritating to the stomach than the iodides of sodium or of strontium. The last named is decidedly the easiest to digest, and the best preparation in the market seems to be the French imported bearing the name of Chapoteaut. It makes a solution in distilled water a grain to the minim. This drug is rather expensive and liable to be adulterated.

The bitter, coppery taste which the iodides produce in the mouth of the patient, and most obvious in the morning upon first awaking, is a drawback in some cases to the free use of the remedy. Occasionally the mouth is made sore by long-continued use of the iodides, the gums get tender and spongy, they swell as in true salivation, and a certain amount of soreness in the teeth is complained of, together with an increased flow of saliva—the whole, indeed, forming a sort of spurious salivation. These two lesser evils may be measurably abated: the first, by the use of peppermint in some form, both at the time of taking the dose and upon awaking in the morning, and by chewing pieces of root licorice; the second, by the use of astringent mouth washes, diuretics, and such remedies as are generally useful in true salivation.

Besides these lesser evils sometimes attending the use of the iodides, there are five other serious discomforts which are attached to their em-

ployment: *acute catarrh, headache, iodism, cutaneous eruptions,* and *irritation of the stomach.*

*Acute catarrh,* to the extent occasionally of rendering the patient very miserable, sometimes comes on at the very beginning of the use of the iodides. The patient sneezes and coughs, the eyes grow red and watery, the nose runs, and with this sometimes comes an intense pain across the brow, and perhaps severe headache. This symptom, like most of the others due to the iodides, varies in intensity with the strength of the dose. Unlike some of the other symptoms, it often wears off as the iodide is continued in use, or at least the patient gets accustomed to it and complains less.

The treatment of this catarrh is to keep the skin active by the use of warm baths, to give the patient plenty of bland fluids to drink, and to encourage the action of the kidneys, the proper channels of exit for the iodides. Belladonna internally, in small quantities, has a certain amount of influence in controlling the amount of secretion from the nose and throat.

*The headache* produced in some people by the use of the iodides is quite intense. It usually occupies the brow, or the side or the whole top of the head. The headache comes on sometimes after a single dose of the offending drug, and sometimes is so intense that it constitutes a positive bar to the continued use of the remedy. Fortunately, cases of this sort are quite rare.

The only treatment is to give a mild diuretic in combination with the iodide, and to add some of the bromide of potassium to the mixture, or even a little opium. Fortunately, this idiosyncrasy of having headache when taking the iodides is not always an affair of a lifetime; the patient generally outgrows it in time.

*Iodism,* properly speaking, includes the headache and catarrh already alluded to; but the main feature in iodism proper is a peculiar and intense nervous depression, with irritability. This occurs in certain individuals when they take the iodides. With this depression there may be more or less ringing in the ears, pain in the bones, etc.

Iodism is difficult to overcome by treatment; usually all efforts fail. The general means mentioned above for the headache of iodine may also be tried here.

*The cutaneous eruptions* produced by the iodides are numerous. Erythema, with considerable scaling of the skin, and acne, with boils about the face, nose, back, shoulders, and buttocks, are not uncommon results of their use. Purpura hæmorrhagica is produced by the iodides, especially in debilitated. anæmic persons who have taken the drug for a long time. A peculiar form of pemphigoid eruption occurring in groups, and sometimes called hydroa (Hutchinson), is another of the evil results of the iodides upon the skin of some patients.

*The irritation produced in the stomach*, and sometimes in the intestine by the iodides, especially when used in large doses, is another seriously bad quality which they possess. In this way nausea and lack of appetite may be induced, going on sometimes to diarrhœa, and leading to anæmia and loss of strength—misfortunes which do so much to counteract the good effects produced by the drugs.

This irritation of the stomach and skin attaches often to an imperfect elimination of the drug by the kidneys. When a patient is under full doses of the iodides, his urine is full of them, as may be demonstrated by pouring a little nitric acid into a test tube containing some of the urine. The stronger acid attacks the salt and liberates the iodine, which colors the urine, lying above the layer of acid. If the kidneys do not do their duty properly, some of the cutaneous expansions of the body must suffer: it may be the membrane of the nose; it may be the skin of the face or back, or the glands this skin contains; or it may be the stomach. The stomach is also particularly exposed to irritation by direct contact with the medicine. This direct contact the stomach always resents, especially if the drug be presented to it in a concentrated form, when it is empty.

The natural deduction from all this is that the kidneys must be kept always active, when the iodides are being administered, by the use of plenty of water and bland fluids on the part of the patient, as well as by diluting the drug largely when it is taken, and giving it always upon a full stomach. If these means do not suffice, the dose of the iodide may be combined with a more active diuretic—such as the acetate of potassium, or the infusion of digitalis, or both.

Sometimes, in spite of all precautions, the iodides cannot be taken by the stomach. Under such circumstances they may be administered by the rectum, giving ten- and fifteen-grain doses of the iodide of potassium or sodium dissolved in an ounce of warm beef-tea.

Above, all it must be borne in mind that the iodides should never be given solid (in pill form) when their use in large quantities is required. Small doses in pill form do very well in some cases, as high as gr. v. of the iodide in each pill; but such pills should be given only upon a full stomach, or, perhaps better, taken during the middle of a meal.

When it becomes absolutely necessary to push the iodides, it should be done in spite of all obstacles to the contrary. It may be necessary to restrict the diet and to give bismuth and a little opium even, but when the iodides are needed they must be pushed at any cost.

*The dose* of the iodides is about five grains to commence with in an ordinary, untried case, and when there is no emergency to deal with. This five-grain dose will generally indicate in what way, if at all, the patient is to be uncomfortably affected by the iodides. An occasional pimple of acne on the forehead or temple is generally all that will be

seen, with perhaps a little excess of secretion from the mucous membrane of the nose during the first few days of the course. For an ordinary case, when there is no haste and the stomach is to be respected, the dose of the iodide may be pushed by an increase of two and a half grains in the dose each week. By such a gradual increase, with a little care, the stomach need not be injured, the skin is not likely to give much trouble, and the weekly increase in the dose may be suspended when the symptoms have fairly yielded.

No such caution, however, can be indulged in when an emergency is at hand. When the soft palate is threatened with rapid destruction by a perforating gummy ulcer, when the bones of the nose are crackling under the touch, when the functions of the brain are involved or life is threatened, then there is no time for hesitation or delay, and it is not necessary to ask whether the iodide will agree or not. If it does not agree, it must be made to agree—a process which may tax the resources, the ingenuity, and the patience of the surgeon to the utmost. Under such circumstances, a dose of ten grains every four hours is a moderate beginning, and in one or two days, according to the surgeon's judgment and the patient's necessities, the dose may be increased by five or ten grains, and so on indefinitely until the symptoms yield or the stomach refuses to receive the drug.

In such a case the stomach must be managed with all care in the manner suggested above, and opium, if need be bromides or diuretics, with bland food, judiciously joined to the iodides in such a way that the stomach shall have no excuse for rebellion. Limit to the dose there is none: the signal to stop increasing the dose in a desperate case is unconditional surrender on the part of the symptoms. If the diagnosis has been accurate and the stomach can be managed, this result will follow as surely as the night follows day. The physician need have no fear, there need be no hesitation. If the stomach holds out, and the drug is boldly and intelligently pushed, victory is the one and only result. All minor symptoms of iodism may be disregarded, the eruptive troubles, the catarrh, even the headache and depression of spirits, although these last make some patients desperate, so that they seem willing to suffer anything from the disease rather than to be compelled to continue their medicine.

The limit to the dose which may be given has not been found. The senior author in one case gave two ounces and six drachms each day for about ten days. It is rarely necessary, however, even in the most desperate cases, to go higher than three hundred grains a day; and such a quantity is better in its results if administered in six than in three doses, always well diluted in milk or aërated mineral water and put into the stomach two hours after finishing a meal or one hour before taking food.

When small quantities are to be given for a considerable time, and the stomach has been first tested with a solution to try its temper, the medi-

cine may be given in pill form for the sake of convenience. Tablets of varied strength up to five grains of the pure iodide of potassium are now found in the shops in the compressed form. They bear transportation well if kept in bottles stoppered with a cork. To make up a pill, however, of any strength, a little pepper, gum tragacanth, and glycerin make excellent excipients. Such a pill when well made grows solid, smooth, and quite hard; but its hardness is no obstacle to its digestion, since the affinity of the iodides for water is very great, and such pills readily break up in the stomach. A fair formula is the following:

℞ Potassii iodidi, . . . . . ʒ ij.
Pulv. pip. nig., . . . . . ℈ i.
Gum. tragacanth.,
Glycerini, . . . . . āā q.s.
M. ft. pil. No. xxiv.

These pills are not unnaturally large, each one contains five grains of the iodide, and they should be taken with or immediately after each meal. In many cases they do not disagree, in others they certainly do.

A favorite method of giving the iodides is in combination with some bitter vegetable tincture or infusion, which serves the double purpose of masking the peculiarly pungent, bitter taste of the drug, as well as in a measure assisting its digestion. The taste of the iodide may be still further covered up by the addition of ginger, peppermint, or bitter orange to the solutions in one form or another, and the dose thus made actually agreeable. Some ammonia may be added, if thought best, out of respect to the general conviction that the presence of this drug enhances the therapeutical activity of the iodide. Such a formula as the following is rarely objected to:

℞ Potass. iodid., . . . . . ʒ ij.
Ammoniæ subcarb., . . . . . ʒ ss.
Tr. cinchonæ co., . . . . . ʒ iv.
Glycerini, . . . . . ℥ i.
Syr. aurantii cort., . . . . . ℥ iss.
M. S. Teaspoonful largely diluted with water after each meal.

For convenience of administration, when the dose of iodide is to be constantly and rapidly pushed, it is well for the patient to have two prescriptions: one something like the one given above, and another a saturated solution of the iodide of potassium in distilled water:

℞ Potass. iodidi vel. stronti iodidi, . . . . . ℥ i.
Aquæ destillatæ, . . . . . q.s. ad fl. ℥ i.
M.

Of this solution one minim measured in a minim glass represents a grain of the iodide, and it may be very conveniently used, a teaspoonful

of the pleasantly tasting mixture being mingled with water, and as many minims extra of the saturated solution of the iodide being added to each dose as may be required to make the dose of the iodide sufficient, in cases in which this is varied a little from day to day.

It will be noticed in the foregoing prescription that only enough water is ordered to make an ounce of fluid in all. As commonly written the prescription reads:

℞ Potassii iodidi, . . . . . ℥ i.
Aquæ destillatæ, . . . . . ℥ i.
M.

Such a formula makes more than an ounce of fluid—nearly an ounce and a half, in fact—and it takes about seven minims to equal five grains of the iodide of potassium.

All the remarks thus far made have referred to the iodide of potassium, nothing having been said of the iodides of sodium or strontium. The potassium compound is the stronger, being just about twice as effective as the sodium combination. How much stronger it is than the strontium salt, if at all stronger, is not yet decided. It is therefore to be preferred, and in all cases should be commenced with first. When, after fair trial and reasonable effort, it has become apparent that the potassium iodide is not suitable, and that the stomach will not bear it, then the strontium or sodium iodide may be substituted often with very good effect, since in this, as in many other cases, the sodium or strontium salt is more agreeable to the stomach than the potassium salt. All that has been written, therefore, concerning the iodide of potassium is equally applicable to the iodides of sodium and of strontium for those cases in which the stronger drug is not well borne.

**Mixed Treatment.**—The mixed treatment is a combination of one of the iodides with a mercurial. It is one of the commonest forms of treatment, and one of the most useful when intelligently directed. It causes even the early symptoms to disappear more promptly than if mercury be used alone. The overzealous young practitioner, in his early efforts to do all he can for his patient, is quite apt to overshoot the mark in trying to obtain for his patient all the good possible out of all kinds of medicine. He frequently gives the mixed treatment (mercury and potash, as he commonly calls it, instead of mercury and iodine, which it more properly is), ordering it as soon as he decides that a given chancre is syphilitic.

There is no advantage in such a course. Mercury is all-sufficient in the beginning, and anything like polypharmacy is of doubtful wisdom, since the stomach and its integrity constitute the sheet anchor of the syphilitic patient in the long run. The patient may have much medication to endure, and it is well to spare him in the beginning. Many stomachs submit to the prolonged use of the iodides without a murmur, for

years; but there are others which gradually fail in digestive capacity, and reduce the patient to a condition of anæmia, with great general nervous irritability and prostration, and that, too, without giving rise to any marked active evidences of dyspepsia. The iodides, long continued, are fully as liable, or more liable to do harm than the mercurials. It may become necessary, during a prolonged and obstinate attack of syphilis, to use not only the mercurials for a long time, but the iodides also; and when it becomes necessary, let it be done. But this is not an excuse for using the iodides out of place, or calling upon the stomach for extra work when it is not required.

The mixed treatment is appropriate in all the slower, more chronic symptoms of the intermediary and late stages of syphilis. The basis of the treatment is an appropriate iodide, either of sodium, strontium, or potassium, as the case may be, and with it a mercurial. The treatment may be effectually carried out by giving a suitable dose of the iodide, as directed in the last section, and adding the mercury by fumigation, inunction, or separately in pill. It is a little more appropriate, however, and perhaps more accurate in dosage when giving the mixed treatment, to mix the drugs themselves in the same pill or potion. The best drug to mix with the iodides is the biniodide of mercury. Most other forms decompose, and the resulting compound is an uncertain amount of biniodide of mercury, with an equally uncertain quantity of the other mercurial, however much there may be which has escaped decomposition.

The biniodide of mercury, therefore, may be added to any of the pills or fluids already referred to in the section on the iodides, in a dose varying from one-thirtieth up to an eighth of a grain. The new ingredient in the combination will make no difference in its form or taste, but often makes a great difference in its effect upon the patient.

Some of the pills found in the market are made so as to represent the mixed treatment, containing varied proportions of the iodide of potassium and the biniodide of mercury.

In using the mixed treatment, it is often desirable to continue the mercury at a given rate while the iodide is steadily pushed. This constitutes what is called mixed treatment with iodides in excess, an expression which will be found to occur several times in this book when speaking of the treatment appropriate to some of the various lesions.

*When to cease giving the iodides* is a question of importance. They are useful, most useful, against certain symptoms in syphilis, but they cannot claim power to prevent relapse. Therefore we should use them, and vigorously too, against the symptoms that they control, but should not depend upon them for any more work after the symptoms have yielded. The main difficulty in the case is, therefore, how to tell when the symptoms in question are thoroughly controlled. A gummatous infiltrated patch may gradually melt away under the bold use of the iodides,

and seem to be entirely gone; yet, if the iodides be discontinued too soon, this patch will relapse in many cases. How can it be, then, that the iodides do not prevent relapse?

The answer to this question may be found by analogy in the study of other infiltrations. Gummatous processes are infiltrations, and the tertiary connective-tissue proliferation, the interstitial hypertrophy of organs, is an analogous change. These diseased conditions of the tissues extend farther than is evident to the naked eye. In the same way cancerous infiltrations and epitheliomatous nodules far outreach their limits as apparent to ordinary inspection. An epithelioma may be burned upon the surface, and the nodule apparently destroyed—so much indeed that a thin, unhealthy scar may form over the spot; yet the morbid tissue, although apparently gone, often remains in the outlying tissues, and in such a case local relapse is inevitable. The same is true of lupus, and the effect of local applications upon it; and of carcinoma, and the cutting operations to which it is subjected.

In the same way in syphilitic infiltrations the remedy which removes them, the iodic preparations, must be long and patiently continued after the local trouble is apparently under control, or local relapse is certain. It is customary, therefore, to continue the mixed treatment for months after all evident need for the iodides has passed, and then gradually to drop the iodides and resume the mercurial at the tonic dose. Eventually the mercury itself may be gradually dropped after a number of months, differing in varying cases, according to the judgment of the physician.

In some cases of the old syphilis, especially the nervous forms, when the iodides have been long given in large doses, the symptoms may after a time fail to yield to the drug, while the patient gradually grows thin, nervous in the ordinary sense of the term, tremulous perhaps in his movements, unable to sleep, to digest food, to perform mental work. Sometimes in such cases the clinical picture suggests the idea of cerebral softening, yet the whole may be due to long-continued excess in the use of the iodide of potassium. A cure is attained by cessation of the iodic course, aided by mental and bodily rest and hypophosphites with strychnine. These are the patients who recover sometimes after a change of physician, or after giving up what they call the "old-school" doctor and trying homœopathy.

*Zittmann's Decoction:*—In terminating the general remarks upon the routine treatment of syphilis, something must be said about Zittmann's decoction. This remedy has long held a respectable place in the minds of the profession, and the formula by which it is prepared, in a stronger and a weaker decoction, retains its place in the dispensatories. It is a remedy of undoubted value in many conditions of late syphilis attended by cachexia, loss of appetite, anæmia, and irritable stomach, especially when the iodides disagree. Its action is probably largely dependent upon the

laxative influence of the senna which it contains, and upon the general combinations which makes the mercury in it acceptable to the stomach.

There have always existed two great drawbacks to its general use: (1) it is difficult to prepare, containing a host of ingredients which must be so concocted that much time is consumed in their proper preparation; and (2) its use according to the rules formerly laid down is too irksome to be endured by most patients, while the quantities necessary to produce any effect (a pint and more a day) cannot be conveniently mastered by many patients with delicate stomachs. Then, also, the rules about preparatory purgation, rest in bed, hot water with one decoction at one time in the day, and cold water with another decoction at another time of day, smack really more of the wizard than of the sage, and tend to bring the remedy into disrepute with honest-minded persons, lay as well as professional.

The truth is probably that judicious purgation, with a light tonic laxative containing a mercurial, and that too in fair dose, is what does the good. In McDonnell's lectures on surgery in 1871,[1] there appeared a modified Zittmann's decoction which did away with much of the apparent superfluity of the older preparation; but even this is too clumsy, with its larger and smaller dose, and cold and hot water. It acts just as well when reduced to a single combination. A tablespoonful is the dose taken without water, three or four times daily, regulating the quantity by the purgative effect. The following is the formula :

| | | |
|---|---|---|
| ℞ Hydrarg. chlorid. corrosivi, | | gr. i. |
| Aluminis, | | ʒ ss. |
| Extr. sarsap, | | fl. ℥ ij. |
| Glycerini, | | ℥ i. |
| Syr. sennæ, | | ℥ iss. |
| Spts. anis., | | ʒ i. |
| Extr. glycyrrhizæ, | | ʒ i. |
| Aquæ fœniculi, | q.s. ad | ℥ viij. |

M. S. Tablespoonful at a dose.

The treatment of inherited syphilis, and of syphilitic women during pregnancy, will be given under their own sections.

[1] Page 114.

# CHAPTER X.

## SYPHILIS OF THE SKIN.

THE symptoms upon the skin and mucous membranes have always given the best field for studying syphilis; and since the dermatologist has brought his powers to bear upon a study of the numerous lesions of the skin produced by syphilis, much peculiarity has been found to exist in all the lesions due to the disease, and much distinctiveness in form, color, grouping, etc., so that the class of eruptions produced upon the skin by syphilis, and known as syphilides, has become well established. The syphilides are generally capable of being diagnosticated by the aid of simple inspection. Before going into the detail of description of the different eruptions it will be well to consider the general characters which are shared by them in common.

Changes in the skin such as the sallowness, the branny condition, the lack of lustre in early syphilis, the flabbiness in cachexia, the general tawny hue often seen in the same stage, the seborrhœa, the dryness—none of these features found upon a syphilitic patient differ materially from the same conditions when encountered upon a patient rendered ill by the action of some other debilitating cause. They are not therefore syphilitic, except in that they have become so by accident.

The peculiar characters of syphilitic lesions of the integument—those which they possess collectively as a group of affections—may be best studied by examining them in detail. They are *polymorphism*, the *color* and *form*, the *absence of subjective symptoms* in connection with them, the *grouping of the lesions, the characters of the scabs and ulcers*, and *the appearance and behavior of the cicatrices.*

*Polymorphism* is quite a distinctive feature in the early syphilitic exanthemata. The evolution of the eruption is in successive crops of lesions, and some of these go on to a fuller development than others; therefore, in one and the same syphilitic eruption, at almost any period in its course, it is often possible to find the most varied lesions associated side by side: the macule, the papule, the vesicle, the pustule, the scale, and the pigment spot.

Polymorphism does occur in other cutaneous diseases, but it is so constant in the syphilitic exanthemata as to be worthy of special remark. The same morbid spot upon the skin, in going through its evolution, assumes the form of several lesions; but in the general eruption there is

always an excess of one lesion or another, and this type lesion names the eruption (papular, pustular, vesicular, etc., syphilide).

*Color.*—The color of syphilitic eruptions is peculiar. The earlier and more acute eruptions are pink and red, a color much like that seen in ordinary inflammatory states. As the freshness dies out of these eruptions, however, they assume the syphilitic tint, and in some instances they possess it from the start. This tint is simply a certain lividity mingled with red. It has been called by many names, but that which suits it best is the raw ham color. The copper color is found to perfection in many of the lesions after they become pigmented, and it often remains for a long time in scars left by lesions, and in the areolar border of the latter, but this term is less accurate in expressing the tint of syphilitic lesions in their period of activity.

The color is due to the inflammatory process which produces and attends the lesions. The superficial vessels become dilated, a certain amount of cell infiltration occurs, and the pigment deposits and shows through.

This hyperæmia and small amount of pigment makes the raw ham color. It is rarely absent in any of the syphilides. As the hyperæmia subsides and the vessels return to their natural size, the pigment becomes more obvious, and then the copper color appears. Finally, nothing is left but pigment in greater or less quantity, and the color may be that of bronze.

The pigmentation remaining behind after syphilitic lesions is not usually permanent. It clears away promptly in light cases, more slowly in others. It remains longest on the lower extremities. It clears up from the centre peripherally, leaving any cicatricial tissue which it may have involved more white than the surrounding skin. Occasionally, especially around a cicatrix in the lower extremity, it remains permanently.

*Form and Distribution.*—The earlier eruptions are generalized more or less over the whole body, each separate lesion showing a tendency to assume the rounded form. Later, the lesions tend to cluster and form patches; they are generally symmetrical in their distribution. The latest lesions show little or no tendency to symmetry, but preserve in a marked degree the rounded form. Gummatous ulcers are often composed of the confluence of several gummata, and the borders of the ulcer consequently are made up of segments of large circles.

*Absence of subjective symptoms* is a marked feature of syphilitic eruptions. In nearly every case, and in nearly every class of eruption, from the macule to the most extensive ulcer, there is customarily an entire absence of any itching or pain. This rule, like all others in syphilis, has its exceptions. An acute outbreak of an early syphilide commonly occasions little tingling, but rarely any itching. Ulcers, if connected with bone, or upon the lower extremities, often pain considerably, sometimes excessively. On the other hand, the scrofulides, and many gouty erup-

tions, with most of the forms of lupus, are equally devoid of subjective symptoms, so that this peculiarity of syphilitic eruptions cannot be considered to be pathognomonic. Nevertheless, the conspicuous absence of itching and pain is a feature of great diagnostic value in connection with the syphilides.

*The scabs and ulcers* of syphilitic lesions have some peculiarities. The scabs are apt to be thick, rough upon the surface, set into the skin at their edges, and adherent, unless undermined with pus. There is generally also a marked greenish tint in the scabs, whether the latter are dark or light colored. This green tint is often due to the admixture of a certain amount of blood with the pus forming the scab. The ulcers of syphilis are round or oval, resemble chancroidal ulcers. Their borders are sometimes undermined, but generally adherent. The floor is pale, uneven, more or less pultaceous, the discharge purulent. The edges are abrupt, perpendicular. The base may be either hard or soft.

*The cicatrices* of syphilitic lesions are quite uniform in character. They are round, depressed, smooth, thin, and not adherent, unless lying over bone. They are dark at first, from the pigment they contain; and as this clears off centrally, the scar grows white and shining, its whiteness intensified and set off by a dark frame of pigment.

**Types of Syphilides.**—The eruptions found upon the skin in secondary and intermediary (late secondary) syphilis are seven. The last three occupy the border line, and may, any of them, be found long after the patient has suffered from well-marked tertiary gummatous lesions of bone, or of the other tissues. These three occur also just as well entirely within the secondary period, and are best classed along with secondary lesions. These eruptions are named according to the prominent lesion which characterizes them. They are:

1. Erythematous (roseola or macular).
2. Papular.
3. Pustular.
4. Pigmentary.
5. Vesicular.
6. Papulo-squamous.
7. Tubercular.

The lesions belonging to the tertiary period, all of which are prone to run on to ulceration, to destroy tissue, and leave scars, are three in number:

1. Pustulo-bullous (rupia).
2. Pustular syphilide: { *a*, with infiltrated base (ecthyma). *b*, in groups.
3. Gumma: { *a*, as infiltration: { 1, non-ulcerative. 2, ulcerative. *b*, tumor.

In connection with all of these occur lesions on the mucous membranes, which will be considered in their proper place, and varied general symptoms: glandular engorgement, fever, alopecia, etc., some of which have already been considered.

**Erythematous Syphilide.**—This is the most common and the earliest of the general syphilides. It may come on within a month after the appearance of chancre, generally six weeks or two months, sometimes later, especially if delayed by treatment. It first appears upon the lower part of the thorax in front and at the sides, over the belly, and in the flanks.

FIG. 86.—Macular Syphilide. (Morrow.)

A very hot bath will frequently develop it several days before its natural date of outbreak.

The eruption comes out as a series of roundish and oblong macules, varying in diameter from one-eighth to half an inch, at first red, then tawny, then pigmented. At first the patches are flat, then they often become covered with minute papular elevations, and sometimes some of these papules go on to vesiculation, occasionally even to mild pustulation (although this is exceptional). The patch, therefore, is flat or raised, as the case may be. At first pressure of the finger causes the mottling entirely to disappear; later a slight, livid staining remains behind after the removal of pressure; finally, when the spot is fading and has become slightly coppery from pigment, pressure has no more effect upon it.

The spots are never confluent—healthy skin always exists between the

macules; but upon this skin there may be found a few other lesions sometimes, such as a papule or a pustule.

The hands and face, where the skin is tougher, often escape the eruption entirely.

The duration of roseola is from a few days to six or eight weeks. It may relapse. An annular variety of large patches in groups, tending to turn into the scaly form, is found occasionally at the end of the first year of syphilis. It runs a slower course than the roseola, occurring soon after chancre. If treatment (mercurial) has been commenced before the appearance of the eruption, its outbreak is postponed, and it may consist merely of a few scattered macules upon the trunk, requiring some diligence to find them.

The diagnosis of roseola due to syphilis is easy. The erythematous eruptions due to arsenic, bromine, mercury, belladonna, quinine, have different situations and groupings, and are attended either by internal fever or local itching. Copaibal erythema itches badly. Roseola autumnalis is attended by fever, and measles by its pathognomonic prodromes. The glandular, epitrochlear, and post-cervical engorgement, the existence of chancre and the throat symptoms (erythema and mucous patches), together with the scabs in the hair, the night pains, and the syphilitic fever, if present, make syphilitic roseola one of the easiest to diagnosticate of all the lesions due to syphilis.

**Papular Syphilide.**—This eruption may be combined with a roseola, or follow the latter; or it may appear as the first syphilitic eruption. Its date of appearance is therefore about the same as that of roseola. The papules vary in size, from a minute acuminated papule, such as is seen upon the macules of roseola, to a broad, flat papule as large as a dime. A common form is the flat, lenticular papule, of about the size of a large split pea. These papules are scattered about, not grouped, occupy the flanks, the trunk, the extremities, and very often the face (Fig. 87).

The characteristic flat papule commences small, and grows in all directions except in height. It is hard and smooth upon its surface at first, later it is sometimes slightly depressed centrally. It is pink or red at the commencement, but very soon takes on the syphilitic livid tint. It sheds its epithelium on top, or the latter dries down quite early and cracks around the circumference of the papule. The broken, rough edge of the thickened epidermis then curls away, like a dirty lace collar, from the base of the flattened papule, giving the lesion a very characteristic appearance. The papules gradually sink away, leaving pigmented spots, but no scars. They come out successively, and may be found in different stages of development upon different parts of the skin.

On the palm of the hand the papules seem to abort, on account of the thickness of the scarfskin. A thickening of the scarfskin seems to take

place, of the size of a papule (papulo-squamous) (Fig. 88). Then the epithelium gets yellow and dry, cracks, and drops out, leaving a clean-cut, punched-out circle in the palm, of the size of a split-pea, with a pink, soft, dry floor, covered with thin epithelium and an undermined, whitened border of thick, raised epithelium, surrounded often by a red areola.

FIG. 87.—Papular Syphilide.

These spots often get well without spreading, thus differing from the later scaly syphilide of the palm. Sometimes, however, these spots are attended by fissuring and undermining of the epidermis laterally, and several spots may coalesce. This is not the rule, but exceptional.

There is a large, flat form of papular syphilide sometimes encountered upon the body, but most apt to be found upon the face and scalp. The papules are as large as the finger or thumb nail. In the scalp they itch. They are of a pale pink color, desquamate readily. Around their edge

the epidermis gets raised by a slight effusion of serum, while the adherent cuticle, bound down centrally in the large lesion, gives the whole an appearance of umbilication which is characteristic.

A flat, livid papule, sometimes excoriated, sometimes dry, is occasionally found indifferently situated upon the skin.

When papules lie in creases in the skin, so that they are constantly covered by other portions of integument (under the breast in the female, in the groin in fat persons), and are thus kept warm and subject to friction, they are apt to become very large and flat. They sometimes run together into patches and become moist on the surface. They may become exuberant and granulate. Under these circumstances the papule becomes the mucous patch of the skin — the flat condyloma. They are common about the anus, the scrotum, the labia (Fig. 89). The gray pellicle upon the surface of these lesions recalls the typical mucous patch of the mucous membranes very exactly. The true mucous patch of mucous membranes is indeed a papule, and the papule on the skin is customarily associated with the mucous patch upon the mucous membranes.

FIG. 88.—Papulo-Squamous Syphilide of Palm. Early stage.

The *duration* of the papular syphilide is very variable. It may come out as the first eruption, either alone or mixed with the roseola, and continue for a period varying from a few weeks to many months. When apparently getting well, it sometimes suddenly relapses without apparent cause. The lesions on the palms and soles, especially if they run together into patches, are particularly obstinate.

Syphilitic papules, unless they ulcerate, leave no scars. The pigment slowly disappears with time, sometimes centrifugally, leaving a pigmented margin, which may persist long after the centre has become whiter than the surrounding skin.

The *diagnosis* of papular syphilide is very easy in typical cases, especially if the eruption is copious, and other concomitant signs of early syphilis are present. Difficulties may arise, however, when there are

only a few papules. A few acuminated papules can with difficulty, if at all, be distinguished from indolent papules of acne, found after middle life in gouty people of dark complexion. The pigmented area surrounding the site of a papule which has run its course is suggestive, but not pathognomonic, of syphilis. In some cases the result of treatment alone will justify a diagnosis.

Flat papules, when occurring in an isolated way, late in syphilis, are also indistinguishable from similar isolated accidental lesions, due to indifferent causes, upon rheumatic subjects. Treatment here again becomes the most valuable aid to diagnosis, or, better still, observation,

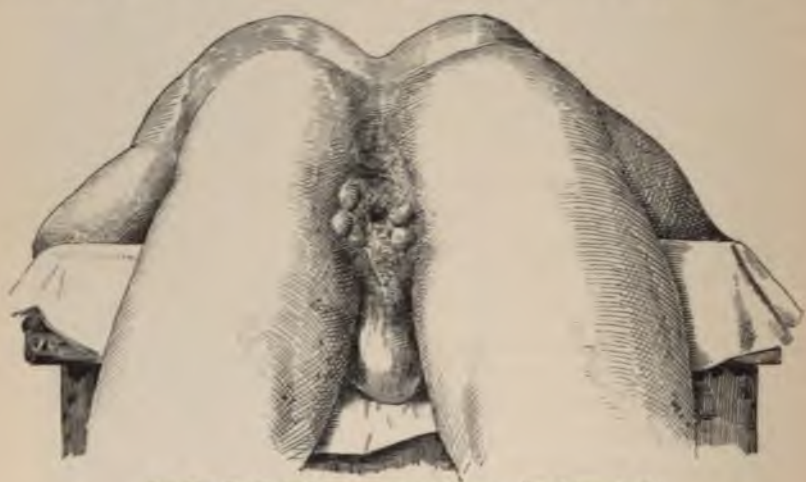

FIG. 89.—Flat Raised Papules around Anus. (Condyloma lata.)

since isolated syphilitic papules do not reproduce themselves indefinitely, while upon certain gouty subjects they recur from time to time with reasonable regularity.

Lichen planus, of all eruptions, is with the most difficulty differentiated from a papular syphilide. The color is identical, and many other features are the same. The most positive distinguishing marks are the umbilication of many of the solid papules of lichen planus, their wide difference in size, their very marked tendency to run into patches, and their tendency to arrange themselves in lines with healthy skin between the different lesions rather than in circles, as is the case in syphilitic disease. Moreover, with lichen planus there are no concomitant symptoms of syphilis found in the lymphatic glands or on the mucous membranes, which could hardly be the case in an eruption of syphilitic papules of like intensity. The palms and soles are much more apt to be spared in lichen planus than in a syphilitic papular eruption.

The flat raised papule (condyloma lata) generally accompanies other syphilitic lesions, and is relatively easy of diagnosis. When seen alone

about the anus, a doubt sometimes arises as to whether the lesions may not be the ordinary vegetations, the so-called venereal warts, which are apt to be found in connection with gonorrhœal, leucorrhœal, and other discharges—indeed, complicating all manner of uncleanness.

The venereal wart is more uneven on the surface than the condyloma lata, more split up and segmented into pointed papillæ, like the ordinary "seed wart." A large cluster of them may grow off from the skin in a pedunculated manner. Their color is apt to be more brilliant than that of the syphilitic papule, and their situation is less frequently the anus or scrotum. They lie most often within the ostium vaginæ in the female; under the foreskin in the male.

**Pustular Syphilide.**—The pustules of early syphilis are found in two varieties: (1) small, scattered, or grouped, arising within a follicle, or occurring independently upon an intervening portion of skin; (2) upon an inflamed base, but still superficial, not gummatous (superficial ecthyma).

*The small pustule* has no very distinctive marking. It is apt to be generalized over the whole body in early syphilis.

The pustular syphilide may come on as the earliest eruption at six weeks, but it does not usually appear before as many months. The scattered pustules found among a number of vesicles, papules, and erythematous spots in the polymorphism of the first eruption do not constitute a pustular syphilide. In the latter the type lesion is the pustule, grouped or discrete. The lesions are found scattered over the whole body, in the scalp, upon the face, upon the fingers and palms, over the whole trunk and extremities. They vary greatly in size, take severally from one to three weeks to reach perfection, and then they usually break and scab, or dry down and heal up under the little crust. When they run together into superficial patches, they behave in much the same way.

When the dried-up scabs fall away the livid thickening of the skin remains for a considerable period marking the sites of the lesions. These livid papules (for such they are) may be marked by a central depression—the hole left by the suppurated follicle—if the pustule has been pierced by a hair; or they may remain ulcerated on top for a time, finally yielding a thin, white, round scar. A ring of pigment around each separate healing lesion in pustular syphilis is rather the rule than the exception; but the pigment finally disappears, and the scars are often so faint that it becomes hard to detect even traces of them in later years. Groups of superficial pustules are much more rare than numbers of discrete pustules.

The pustular syphilide is slow. Crops of pustules come out at different times, relapses are not uncommon; and, unless treatment aided by tonics shortens the duration of the affection, it is apt to drag itself along during several months.

The *diagnosis* of superficial pustular syphilide is generally easy from the concomitant symptoms and history. Iritis is apt to complicate it.

The bronzed areola of the subsiding lesion is a great help to diagnosis. A generalized, pustular, superficial, discrete eruption is very rarely due to any other cause than syphilis, and the appearance of such an eruption should immediately suggest an inquiry into the patient's previous history.

FIG. 90.—Pustular Syphilide, Showing both Types.

The *superficial ecthymatous syphilide* is a little deeper, a little more intense, being more deeply seated than the simple early pustular syphilide. It indicates that the patient has a bad type of syphilis, especially if it comes on early. It generally appears as late as during the second year—late enough to be called tertiary; but in bad cases it often comes on early, within a few weeks of chancre, and it leaves a faint scar, not indicating any considerable destruction of tissue. Occasionally, on the other hand, it accompanies early malignant lesions in very bad syphilis, and destroys considerable tissue, which of course necessitates a deep scar.

This syphilide starts as an infiltration of a limited area of skin capped by a pustule, or of a patch of skin upon which several pustules appear, at first discrete, later confluent. These pustules are generally large and flattened; they may even be umbilicated. The pustules develop rather slowly, with little or no pain, and finally scab, an ulcer existing under the scab for some time after the latter has formed. The pigmented areola comes on during the latter part of the development of the pustules. The scar remains long purple, often raised and thick, generally pigmented, and sometimes pitted. Finally the scars become perfectly white, more slowly upon the lower than upon the upper extremities.

The *diagnosis* of this form of syphilis is not difficult except in occasional cases in which, as sometimes occurs, fever runs high with the first outbreak of the pustules, and in which umbilication is marked. A mistake has been often made in such cases, and the patient has been sent to a smallpox hospital. The mistake may be avoided by noticing the more sluggish development of the syphilitic pustules in crops, the absence of

intense pain in the back, the history of the case, and the concomitance of other (mouth and glandular) evidences of syphilis.

The superficial ecthyma of early syphilis differs from the deep ecthyma of late syphilis, in that the latter is a gummatous infiltration of the true skin, has a livid, hard base, and always leaves a depressed, round, white, thin, smooth, unpitted scar.

**Pigmentary Syphilide.**—This eruption, the very existence of which is questioned by some authors, while its syphilitic character is doubted by many who acknowledge its existence, was first accurately described by Hardy, later by Fournier.

This syphilide is simply a coloration of the integument, varying from a light dirty brown color to almost a black, a mottling formed of patches, light and dark. The light areas of skin are sometimes of a natural hue, sometimes whiter than the original integument.

The eruption is generally found upon the sides of the neck, in front and on the upper part of the chest; exceptionally elsewhere, as upon the trunk, the hands. It is generally ignored by the patient, and often discovered only through accident by the physician, or after careful search.

The lesion has been considered to be the lesion left behind by a roseola, and at best it is an obscure affection of but little moment. As corroborative of past syphilis, it may be of some value. It comes on anywhere in the second half of the first year after chancre, and may last many months, but it always finally disappears. It is totally devoid of any subjective symptoms, and absolutely uninfluenced by treatment. It cannot possibly be mistaken for anything except dirt, pityriasis versicolor, freckles, or leucoderma. The first of these washes off; the second itches faintly, is a little branny, and furnishes spores for microscopic diagnosis; the third are more yellow, and never confined to the limited region of the sides of the neck and upper part of the chest. Leucoderma of the common sort has a different distribution.

**Vesicular Syphilide.**—This eruption is rare. Its date of appearance is late in the secondary period, generally during the second year after chancre.

The vesicles may be of varied size, but generally are small, acuminated, scattered about the trunk and extremities (the face being spared), or clustered into groups in circles, or segments of circles, upon a livid base of characteristic syphilitic color. Each of the lesions may be surrounded by an areola, at first livid, then coppery, and the vesicles may dry up and scale, or become purulent and scab over.

There is a form of vesicular syphilide coming on earlier (within six months after chancre), the vesicles being large, umbilicated, upon a reddened base, with an areola at first livid, then coppery. The vesicles quickly become purulent.

All the vesicular syphilides are slow in evolution and apt to be pro-

longed by successive outcrops of new vesicles and clusters of vesicles continuing to appear as the first dry up. The livid spots left by the vesicles gradually whiten and leave either no scar or pitted cicatrices.

The *diagnosis* is easy. The umbilicated vesicle may suggest varicella, but there is no itching except in the scalp, and other syphilitic lesions are apt to accompany this umbilicated form of the eruption. The generalized vesicular syphilide does not become confluent and yield an oozing surface as does eczema. The color, the areola, the grouping, the absence of itching, distinguish it easily from other vesicular eruptions.

**Papulo-Squamous Syphilide.**—The papulo-squamous syphilide occurs toward the end of the first year of syphilis, or at any period later. It may come on long after the tertiary stage has set in, after gummata have appeared, after bone disease has been inaugurated and cured. Long after the patient thinks himself well, several years perhaps after the appearance of any symptom due to syphilis, an elevated patch of squamous syphilide may appear upon the face and be improperly called a lupus by the physician—or a circinate scaly eruption comes out upon the scrotum and here the patient looks upon it as a ringworm.

Solid patches of papulo-squamous syphilide may occur upon the face or any part of the body. The skin is thickened, more or less livid, often not distinctly papulated, but infiltrated. The size and shape of the patches vary greatly, from small dots to broad, rounded sweeps of eruption. The livid surface is covered with fine white scales, which are tightly adherent. These scales shed off and are replaced by new crops, until finally the infiltration disappears and the patch gets well, leaving no scar. If the patch has been positively tuberculated as well as scaly, round scars, not much if at all pigmented, are apt to be scattered over the livid scaly area covered by the eruption, and these scars remain permanent after the affection gets well.

The *circinate form* may come on early or very late in syphilis, attacking any part of the body, but most common upon the scrotum, or about the genitals, in either sex. The circle, or segment of a circle, starts of a given size, and does not increase like ringworm. A number of segments of circles often run into each other, making a festooned, gyrate figure. The border of the circle forming the eruption varies in breadth up to about a quarter of an inch; generally it is but little wider than an eighth of an inch on the scrotum. The skin enclosed by the segments of circles remains sound. The border of the circle is generally distinctly papulated, some of the papules being dry, some moist, some scaly, some scabbed. About the genitals patients sometimes assert that the eruption itches.

*Diagnosis.*—Coincident symptoms of syphilis, and the history, together with the common situation along the roots of the hair on the forehead, about the genitals, etc., help to make a diagnosis which the effect

of treatment will promptly justify if it has been accurate. In color, on the other hand, and general arrangement, patches of papulo-squamous

FIG. 91.—Papulo-Squamous Syphilide. (Morrow.)

syphilide are sometimes quite indistinguishable from some forms of psoriasis, and a localized patch on the face is sometimes nearly enough like erythematous lupus to deceive a practitioner not expert in the differential

diagnosis of skin diseases. The circinate, scaly syphilide cannot long be mistaken for ringworm, since in syphilis the circle does not grow by centrifugal enlargement.

The *palmar and plantar papulo-squamous syphilides* are lesions of the first importance in connection with syphilis. There are several varieties of this eruption. One of them has already been described, namely, the round, livid, dry spots on the palm, looking as if a piece of the epithelial layer had been cut out with a punch, and the borders of the scarfskin

FIG. 92.—Palmar Papulo-Squamous Syphilide. Advanced stage. (After Kaposi, Morrow.)

afterward slightly undermined (Fig. 92). Besides these spots, which are best observed in connection with a generalized papular syphilide, other rounded and oblong scaly patches of the palm and sole are encountered in syphilis at almost every stage of the disease.

These are, with few exceptions, round and oval. The different lesions commence as livid, red areas, or as round, epidermal patches of a yellow color, according as hyperæmia of the surface vessels or cellular infiltration is the more pronounced pathological process. As the lesion progresses it spreads centrifugally, the epidermis fissures and scales off, and the differ-

ent lesions run into each other, making a large patch with irregular, rounded border (Fig. 92). The centrifugal spread of the patches leaves a livid, pink centre, free from any special lesion other than hyperæmia. In the natural furrows of the palm or sole, and at their border, deep fissures are apt to form in the edges of the eruption. Friction upon the palm, as in rowing, using tools, etc., is an active, exciting cause; much walking and ill-fitting shoes act in the same way upon the sole. Elevated livid tubercles, more or less scaly, also occur in patches upon the palm.

Symmetry is not the rule in either palmar or plantar syphilis.

*Diagnosis.*—Some forms of lichen urticatus, of eczema, and of psoriasis resemble it very closely. In the first and last of these affections, however, the plantar or palmar lesion is never found alone. The character of general eruption upon the rest of the body, therefore, clears up all doubt concerning the lesion in question. An eczematous patch, however, may be found exclusively confined to the palm. It is apt to itch, it is thinner at the edge, shades off into the surrounding integument more than the syphilide does. It is not so livid in color, and has no purple border, as is sometimes the case in the syphilide. Eczema is more irregular, less rounded in outline, much more chronic in duration, as a rule, and apt to extend out over the palm upon the softer skin around.

**Tubercular Syphilide.**—This syphilide occurs in two forms—generalized, or in groups. The generalized form is quite unusual, that in groups very common. The former rarely occurs before the second half of the first year from chancre; the latter quite exceptionally before the second year. Isolated patches of tubercle may come on at any date, many years after all traces of the disease have disappeared.

The *general tubercular syphilide* is not the papular syphilide in which the papules are large. It develops deeply down in the tissue or the true skin beneath the papillary layer. It is not a gummy tumor of the subcutaneous tissue. When it occurs as a generalized eruption, it does so as an eruption of patches and groups of clustered lesions in circles and segments of circles. Some of the patches are the result of a confluence of many tubercles, and then the patch is a solid livid elevation of the skin, uneven on the top, and covered with scales. Each separate lesion, if it stands alone, is livid in hue, capped with a scale or a small pustule, and often surrounded by a livid areola, afterward becoming coppery. The different tubercles vary in size from a grain of rice to a good-sized pea, and they usually leave a cicatrix when they disappear, whether their surface has been ulcerated or not. The scar is at first livid, then often pigmented, then white, round, thin, smooth, depressed, not at all retractile.

The *diagnosis* is easy. It is hard to imagine an eruption with which the tubercular syphilide could be confounded.

The *tuberculo-squamous or tuberculo-ulcerated syphilide in groups* is a late lesion. It is, indeed, positively tertiary, but often occurs upon the

border-line. The face is a favorite seat of the eruption, but it may occupy any part of the body. Livid patches of thickened skin constitute the eruption.

Scales upon these patches are quite obvious, but the tubercles may be

FIG. 93.—Tubercular Syphilide. (Morrow.)

scarcely so, perhaps not visible at all. Sometimes the only reason one has to call the affection tuberculo-squamous is the existence of round, white, depressed scars upon the surface in among the scales, of the size of a pea, marking the site of tubercular infiltrations of the true skin, the

interstitial absorption of which has produced the white scars. Generally the tubercles are quite plainly visible upon the surface. Sometimes they stand apart, sometimes they run together and enclose areas of healthy skin within raised circular borders.

The evolution of the patch is by the circumferential growth of new tubercles. Those first formed disappear, leaving scars without previously ulcerating, and upon the old spots where former tubercles have flourished and gone away new ones may crop out later and go slowly through their changes, leaving scars behind. Ringworm may be simulated by circinate patches of tuberculo-squamous disease.

This syphilide is maintained by the successive outcrop of new tubercles, and a single patch may thus be prolonged for years. Sometimes the infiltration which forms the tubercle goes on so rapidly that the integrity of the integument is compromised, ulceration takes place, and a serpiginous ulcer results, as after the pustular syphilide in groups.

The *diagnosis* of tubercular syphilide in groups is very easy if attention be paid to the central cicatrices in the patch. These are round, white, smooth, and not puckered. In tubercular non-ulcerative lupus this quality of scar is not observed, the cicatrix being puckered and linear. This feature alone is all that is required to make a distinction. The lividity of color is much more marked in syphilis than in lupus.

## Tertiary Syphilides.

The final three sets of eruptions to be considered—rupia, ulcerative syphilis, and gumma—are strictly tertiary. They all occur habitually in the second year of the disease and later, and they uniformly and inevitably destroy the structure of the true skin and leave scars. Treatment postpones their outbreak, or may prevent them from appearing at all.

Eruptions of this kind may be ushered in while the patient is enjoying apparently the most flourishing health. They are all painless, unless they involve a bone or joint, as well as the integument. Sometimes they accompany the profound cachexia produced by syphilis; but the same cutaneous lesions may be found upon patients who present no evidences of cachexia whatsoever. Rupia, however, whether the patient shows cachexia or not, indicates a very bad quality of constitution.

**Pustulo-Bullous Syphilide (Rupia).**—Rupia sometimes starts as a flat pustule, sometimes as a bulla. The patient may look fat and seem healthy, but he is not so, or he would not have rupia. If a bulla first forms, it runs on quickly to suppuration, and blood becomes mingled with the pus. The first lesion thus formed scabs over, and under the scab ulceration commences, yielding pus, which raises the scab from its bed. Meantime around the scab first formed an epidermal raised ring appears, filled with sero-pus. This dries down into a blackish-green scab, enlarging the first

crust, while ulceration goes on beneath the whole. A new sero-purulent subepidermal collar forms again around the lesion, and the process goes on repeating itself.

The new layers of pus supplied from beneath raise and thicken the scab, and if this process continues long without much increase in the area

FIG. 94.—Rupial Syphilide.

of the patch by the formation of circumferential bullæ, as may be the case, a horn may be formed sometimes an inch long or more, and in any case the roughened crust comes to bear a close resemblance to an oyster shell, and pressure upon it generally causes pus to ooze out at one of the edges of the sore. If the scab gets detached another may form, or the lesion

may progress as an open or a partly scabbed ulcer, with a livid or pultaceous base and sharp-cut borders. Sometimes cicatrization goes on under the scab, which finally falls off, leaving a livid cicatrix, generally covered with ridges, drawn and puckered in part, sometimes surrounded by a coppery areola, sometimes having only a livid border. In almost all cases the scars eventually become white.

**Tertiary Pustular Syphilide.**—In tertiary disease the pustular syphilide is found in two forms. As a pustule with an infiltrated base, ecthyma, and as a patch of pustules beneath which destructive ulceration goes on.

The deep ecthymatous pustule is a general gummy infiltration of the skin, capped with a pustule, which usually goes on to ulceration.

The gummatous thickening of the skin is obvious in the case of single isolated ecthymatous lesions, but it becomes lost as the single lesion ulcerates or the patch of ecthymatous pustules spreads. When this thickening is present it exists as a lurid, painless, hard lump, often surrounded by a bronzed areola, especially upon the lower extremity, as the isolated ecthymatous spot gets old.

FIG. 95.—Tertiary Pustular Syphilide.

The thick green crust which forms upon the top of an ecthymatous pustule resembles a rupial crust. Its edges are thin, and frequently are depressed beneath the level of the surrounding skin, making the latter look like a setting which holds the scab in place. These scabs are quite adherent, and may remain attached until cicatrization is complete (Fig. 95).

The cicatrix of a single deep ecthymatous spot is the typical syphilitic scar, smooth, thin, white, depressed, non-adherent. At first it is livid, and it remains in most cases surrounded for a long time by a border of pigment.

The favorite seat of deep ecthyma is the lower extremities — but it may be found anywhere upon the body, and is not uncommon on the face.

When several ecthymatous lesions run together, an ulcer may result,

which may become serpiginous, and creep over a considerable extent of surface, often getting well on one side as it advances toward the other (Fig. 96).

Ecthyma does not necessarily indicate a bad condition of the patient.

The *pustular syphilide in groups* generally comes on late in syphilis. A red spot appears, which quickly becomes covered with small pus-

FIG. 96.—Ulcerous Syphilide.

tules. These run together and scab, and beneath the scab ulceration goes on. As the ulcer grows, so does the scab, and if the latter falls off or is removed, a new one forms. The secretion beneath the scab is scanty, and the crust, therefore, does not become rupial.

Finally, when the patch has reached a considerable size in some cases, the new pustules around the edges upon the livid areola cease to form,

the whole patch dries up and contracts, cicatrizing under the crust. When the latter falls, a livid scar is left, with a bronzed areola. The centre whitens, the areola generally, but not always, disappears.

A serpiginous ulcer may result from this lesion, as it may from ecthyma, or from rupia.

An error in diagnosis is not probable. The pustular scrofulide generally comes early in life, and the lesion with its ulcer has different characters.

FIG. 97.—Tertiary Syphilitic Ulceration.

The *syphilitic tertiary ulcer* is not an especial affection. It is a second stage of rupia, ecthyma, patches of tubercles, or of pustules, or a sequence of gummy infiltration, or of gummy tumor of the skin.

The ulcer always has similar characters, whether destroying in depth or running superficially upon the surface (serpiginous ulcer). The ulcer has perpendicular edges, hard, livid (generally), adherent borders, a livid, pultaceous floor (sometimes smooth and shining), and often a hard base. These lesions are painless for the most part, unless they involve the periosteum from being situated over it, as on the shin, or unless they become inflamed from injury, or by position, as on the lower extremity.

The syphilitic ulcer may remain stationary, it may eat downward, exposing a bone, destroying the periosteum, and leaving a piece of bare bone in the floor of the ulcer. This bone, at first white, becomes black. It often dies, gradually separates from the healthy bone beneath, and is thrown off. The deep, destructive ulceration which deforms the nose generally follows a gummy tumor or gummatous infiltration. The same may be said of the destructive ulcer of the penis.

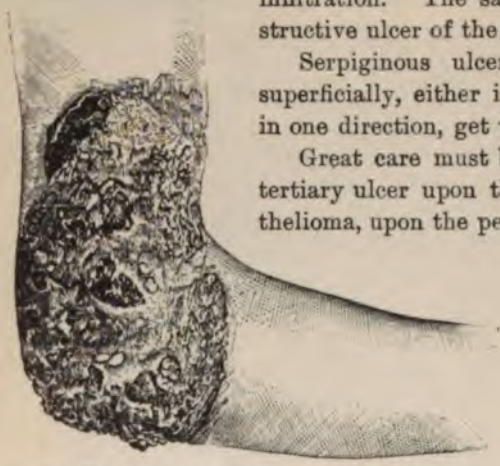

FIG. 98.—Tertiary Syphilitic Ulceration of the Arm.

Serpiginous ulcers are those which spread superficially, either in all directions or, advancing in one direction, get well in the other.

Great care must be exercised to distinguish a tertiary ulcer upon the tongue or lip from an epithelioma, upon the penis from a phagedenic chancroid or an epithelioma, upon the nose or face from an ulcerative lupus or a rodent ulcer. The peculiar characters of syphilitic ulcers, so often already detailed, ought to be sufficient to guide to a diagnosis in most cases. In all cases of doubt the touchstone of treatment, if intelligently applied, will clear up the question promptly.

**Gumma of the Skin.**—Tubercular and ecthymatous patches are certainly the seat of gummatous infiltration. There is also a true gumma of the skin, which appears as a general infiltration, and another form which takes the shape of a circumscribed tumor. Either form may ulcerate; the latter habitually does so unless arrested by treatment.

*Diffuse gummatous infiltration* of the skin is not common. It occurs as a patch of livid redness, hard, raised, somewhat scaly on the surface, perhaps for a long time smooth and shining. Upon this surface little prominences may appear, which quickly ulcerate. The ulcers run together and behave like the syphilitic ulcers already described, remaining stationary or becoming serpiginous, but not destroying in depth. Rarely the patch sinks away, leaving a general thinning of the skin behind, but no distinct scar as such.

Gummatous infiltration of the skin presumably precedes all ulceration of the serpiginous sort, whether coming on as a sequence to rupia, ecthyma, or any other lesion; and the infiltrated patches bearing tubercles, scales, or pustules owe their infiltration undoubtedly to an analogous pathological condition.

The *gumma* proper of the skin is, strictly speaking, the syphilitic

tubercle. The gummy tumor, yielding an ulcer on the skin, is generally a localized accumulation of gummatous cells in the subcutaneous connective tissue. These are first noticed as hard, shot-like bodies beneath the skin. They are absolutely insensitive upon manipulation. The skin is freely movable over them, and they themselves are not attached firmly to the surrounding or underlying parts. In this state a subcutaneous gumma may remain for months, and sometimes gradually disappear even without treatment, leaving no apparent trace of its former existence. Generally, however, unless treatment intervenes, the lump gradually enlarges, attaches itself to all surrounding tissues, softens centrally, and the detritus of gummy matter slowly but surely ulcerates its way to the surface.

The skin over the tumor in such a case becomes livid and thin, the soft central spot finally gives way, and the contents of the tumor escape. This detritus is composed of broken-down gummatous cells, and the débris of the intervening tissue which was infiltrated with those cells. After discharging, the gumma remains open as a deep syphilitic ulcer.

Gummata of the nose are very apt to lead to perforation, destruction of bone, and permanent deformity. Gummata occur over the whole body. Local traumatisms seem sometimes to call them into existence.

Wherever the gumma occurs, the tissue which is implicated is certain to be destroyed. The remains of the solid parts may become cretaceous and encysted, and continue in this state indefinitely. Sometimes gummatous exudation is entirely absorbed, leaving behind a cyst containing a little fluid. This termination is exceedingly rare.

**The treatment of syphilides** of the skin is that of the stage in which they occur. Local measures are unnecessary in some and very useful in other instances. Their consideration is taken up in the section on general treatment.

# CHAPTER XI.

## SYPHILIS OF MUCOUS MEMBRANES, LYMPHATIC GLANDS, HAIRY PARTS, AND NAILS.

THE mucous membranes of the body, as well as the outside integument, are affected by various lesions in the course of syphilitic disease. These lesions are few in number. Some of them occur early, some late in the disease, others at all times. They are, in the mouth, throat, and nose:

1. Erythematous patches with erosions and superficial ulcers (occurring at all times).
2. Mucous patches (occurring in the typical form only during secondary syphilis).
3. Scaly patches (occurring only late in syphilis).
4. Gummatous ulcers (occurring only late in syphilis).

**Erythematous Patches, Erosions, and Superficial Ulcers.**—These lesions, most notable during the earliest general outbreak of syphilis, may yet appear in modified form throughout the disease, either in connection with the various eruptions or independently. Often, during the syphilitic fever, when the lymphatic glands behind the neck just begin to be perceptible, careful inspection will show that the fauces are covered with a uniform redness, suggestive of a common sore throat. This redness may extend out of sight up into the nares and down below the pharynx.

With this erythema the patient generally complains of more or less pain, and he may be temporarily deaf, or lose his voice for a few days.

In connection with this redness, excoriations may occur upon the lips, upon the throat, along the edges, upon the dorsum, and at the tip of the tongue.

Peculiarly common after the lapse of several years is an angry reddened excoriation of the sides of the tongue, far back near the root, on both sides. This may exist for months without ulcer or scaly patch. It is kept up by smoking, and by rough edges of teeth, but occasionally occurs without the aid of either of these exciting causes.

**Mucous Patches.**—The typical mucous patch is a lesion found only in syphilis and in perfection, usually, only in early syphilis. It may come on simultaneously with the first erythema of the throat, and continue to appear from time to time throughout the secondary period; but it is commonly seen in greatest perfection in connection with the general papular syphilide of the integument. The forms occurring late in the secondary

and during the tertiary period are usually scaly patches and excoriations, resembling the squamous syphilide more than the papule. The true mucous patch is a flat papule with a sodden epithelium capping it. Its connection with the papule has been touched upon in the description of the flat papular syphilide, where it was shown how any flat syphilitic papule, kept moist and sodden, becomes a mucous papule of the skin.

Clinically speaking, the mucous patches are round, or irregularly rounded, raised patches of a dirty white color, sometimes red and granulating, covered with a more or less puriform secretion. In size, they vary from a point to large, irregular surfaces, generally produced by the confluence of several patches, and capable of reaching almost any dimensions. They occur about the tonsils, and upon all the pharynx, within the lips, or upon the tongue, within the nose, and down in the larynx and trachea, where they have been repeatedly observed with the laryngoscope. Unless ulcerated or attended by surrounding erythema, they are painless. Often the patient is unconscious of their existence. When they ulcerate or inflame, they may become quite painful.

They relapse frequently, and continue to come out upon the mucous membranes, either spontaneously, or, more often, as the result of local irritation—a rough tooth, smoking.

Mucous patches do not leave any scars unless they ulcerate, and even then, the ulceration being superficial, the scars are not well marked.

**Scaly patches** upon the throat, tongue, and the inside of the lips and cheeks are very common during the second year of syphilis and later. They take the place of mucous patches, and are frequently called by that name. They may occur early enough in syphilis to be associated with the true mucous patch, but their natural position is later in the disease.

They appear as flat, rounded, irregularly shaped patches of a bluish-white color anywhere within the mouth, but by preference at the angles of the lips, and on the tip, sides, and dorsum of the tongue. They are quite flat and insignificant-looking. They are manifestly due to epithelial thickening, and their whiteness depends upon this fact. Sometimes a limited patch (particularly under the tongue) will take on extensive overgrowth and yield an adherent white patch of epithelium as thick as a piece of blotting-paper. Sometimes these occur also in the angles of the mouth. Sometimes the entire dorsum of the tongue becomes covered with this scaly syphilide, giving it a mottled white and blue-white appearance.

These patches cannot be scraped off. They are not ulcers. If roughly handled they bleed. They are generally sensitive, although not seemingly inflamed, and when large patches exist in the mouth the contact of condiments causes pain, and eating is accomplished only at the expense of great discomfort. Occasionally they ulcerate, but this is not the rule. They occur also in the vulva.

Smoking, chewing tobacco, all irritants applied to the mouth, the rough edges of teeth, lack of cleanliness, are exciting causes of the scaly syphilide of the mouth.

These patches sometimes closely resemble true ichthyosis of the tongue.

The mingled excoriations and scaly patches found not infrequently upon the tongue and in the mouth of persons having a tendency to dry eczema, once seen, could not be mistaken for a scaly syphilide.

**Gummatous Ulcers of the Mouth and Fauces.**—Besides the slight round ulcers and the irregular erosions of the mouth common to the whole period of syphilis, three other forms of ulcer occur, namely: the stationary, chronic, infiltrated ulcer; the serpiginous ulcer; and the ulcerative gummy tumor. All of these occur late in syphilis. The infiltrated ulcer is also found early in the disease.

The *deep, ragged, brawny ulcer of the tonsil*, found in syphilis, may be encountered early and late in the disease, alone and coincidently with other symptoms. This ulcer occupies the tonsil by preference, usually is oval, with its long axis parallel to that of the tonsil. It may extend over upon either of the half arches, or upon the soft palate. It may indeed occur spontaneously at the angles of the mouth, inside the cheeks, or elsewhere. The base is pultaceous, the borders are cut away, generally livid, sometimes pink, usually hard and accompanied by a sodden, livid condition of œdematous infiltration of all the surrounding tissues.

The ulcer remains stationary or progresses slowly. It often occasions great pain, especially upon swallowing. But little tissue is destroyed, and the resulting scars are not deep.

The *serpiginous ulcer* occurs later in the disease, and is manifestly a gummatous infiltration. The seat of these ulcers is varied. The edge, or the upper part of the soft palate, is not infrequently involved, and quite often the back of the pharynx. More rarely other parts of the mouth are affected. Not infrequently, with this form of ulcer in the pharynx, the larynx is the seat of tertiary syphilitic disease.

These tertiary, serpiginous ulcers sometimes remain stationary for months, even years, upon the pharynx, giving very little pain.

Sometimes they advance rapidly, eating off the uvula in a few days, and destroying large portions of the soft palate by eating it away from the edge inward. When such ulcers get well they occasionally leave the pharynx much distorted by cicatrices.

The gummy, stationary, or serpiginous ulcer of the pharynx generally goes with a bad type of disease, and is often associated with profound syphilitic cachexia.

Gummy tumors may appear anywhere within the mouth. Gumma of the tongue will be described under the head of syphilis of the digestive organs. The gumma of the hard or soft palate is not uncommon, and is very dangerous on account of the damage it is likely to cause if unchecked.

A submucous, round, insensitive swelling first appears, not attended by pain. Perhaps the gummatous infiltration is diffuse over a limited area, and not concentrated into a single nodule. The growth of the gummatous material may be slow at first, but it is often rapid from the start.

When the tumor has reached a certain size, the mucous membrane over it becomes œdematous and rapidly gives way, disclosing a cavity which constitutes a gummatous ulcer like that seen upon the skin, with perpendicular edges and a deeply situated grayish-yellow floor. The diffuse infiltration in a similar manner may soften suddenly, and rapid ulceration sweep away quite an expanse of tissue.

Extensive destruction of tissue may ensue unless treatment intervene, and large portions of the roof of the mouth may be sacrificed to obscurity of diagnosis or lack of therapeutical boldness.

As a prophylactic measure against syphilitic lesions in the mouth all possible sources of irritation should be avoided, and strict cleanliness should be observed. For the mild and simple lesions the general internal treatment of the disease may be all that is required.

As regards smoking, it need not be discontinued except in individual cases in which it proves a source of irritation.

In the more severe lesions smoking should be prohibited, a daily mouth wash of mild corrosive sublimate (1 : 4,000–6,000) or some active detergent (borolyptol) should be ordered and the internal treatment judiciously pushed. Sluggish ulcerations are assisted toward healing by the application of a strong solution of nitrate of silver or the acid nitrate of mercury. The general treatment is considered under that heading.

Late manifestations of syphilis in the mouth call for a vigorous course of the iodides.

## Syphilis of the Lymphatic Glands.

As has already been stated, the lymphatic glands receiving the absorbents from the region occupied by the initial lesion of syphilis undergo indolent engorgement. Then follows a rest (second incubation period), and then general syphilis.

At the commencement of general syphilis, usually before the outcrop of any general eruption, certain glands become indolently engorged and constitute valuable corroborative evidence of the syphilitic nature of any other symptom which may subsequently appear.

The glands which are of clinical value in the diagnosis of general syphilis are the epitrochlear and the posterior superficial chain of the post-cervical glands, especially the highest two of the chain, those lying on the occipital bone, one on either side of the nucha. The post-aural glands are also often involved, the lateral glands in the neck, and the axillary glands.

The glands become as hard as bullets, freely movable in all directions,

and not adherent to the skin. The integument over them is not colored, and they are insensitive to pressure, with occasional exceptions, when they first come out. They rarely get larger than a good-sized pea.

The duration of these glandular indurations is quite protracted. They appear about six weeks after chancre, and habitually last for months—but little, if at all, affected by treatment. They generally disappear during the first year.

Other glandular lymphatic engorgements do occur constantly in syphilis in various regions. In connection with mouth lesions, or spontaneously, one or more glands of the neck indifferently situated may suddenly swell up, remain enlarged for a long time, perhaps finally suppurating, or abscess may promptly form in a gland, running on to a speedy opening and discharge.

Sometimes these glandular enlargements reach a great size, soften, but fail to discharge, and, not being opened, their contents dry up and are absorbed, a caseous, cretified mass being left behind.

These same changes in the lymphatic glands may occur in the groin, axilla, and elsewhere, but are most common in the neck.

Finally, tertiary gummata are encountered in various glands, internal as well as external, which may ulcerate externally, forming gummatous ulcers, and may disappear by absorption, especially in response to treatment. The abdominal glands will be referred to again in connection with visceral syphilis, and the consideration of syphilis of the spleen and of the suprarenal capsules will be more appropriate there.

### Syphilis of the Hair and Nails.

The alopecia of syphilis is a feature of early secondary disease, very often observed in connection with syphilitic fever and with the first eruption. It varies greatly in degree, being generally quite moderate and confined to the scalp, from which it thins out the hairs to a greater or less extent, while occasionally it is very severe, implicates the whole body, and perhaps causes the shedding of all the hairs.

This shedding of the hair in early syphilis is a mere accident, and not intrinsically a syphilitic symptom. It is the result of the anæmia of early syphilis, and is due to a failure of a full supply of nutrition to the hair papillæ. This loss of hair is never permanent when occurring in a young person.

Later in syphilis from cachexia, there may be a similar thinning of the hair, and in these cases the hair is less apt to grow again.

Finally, in cases of ulcerative disease, involving the hair papillæ and destroying them, localized areas of baldness ensue, which are necessarily perpetual.

The *treatment* of syphilitic alopecia is a general treatment of syphilis

—the treatment of that stage in which the alopecia occurs. There is much value in mercury both as a preventive to the fall of hair, and to arrest the fall after it has commenced in the alopecia of early syphilis. The cachectic form occurring later generally calls for mixed treatment combined with tonics.

The patient should be told to wash his scalp thoroughly once or twice a week, either with tar soap or with borax ʒ i. to the ℥ ij. of hot water, or with liquor ammoniæ, a drachm to the pint of hot water, according to the dirtiness of the scalp and the amount of seborrhœal exudation which it is desired to remove. Rather hard brushing with moderately stiff brushes is to be recommended.

Finally, a stimulating lotion should be rubbed every night, in small quantities, well upon the scalp, and into the follicles under the hair. Such lotions add a little to the chance of preserving the vitality of some of the hairs whose life is only threatened, and encourage the growth of the new hair. The following are good lotions:

| | | |
|---|---|---|
| ℞ | Chloral. hydrat., | ʒ iss.–iij. |
| | Tr. capsici, | ʒ vi.–xiv. |
| | Glycerini, | ʒ ij. |
| | Spts. myrciæ, | q.s. ad ℥ vi. |
| M. | | |

Instead of the glycerin and bay rum, oil of sweet almonds with cologne water may be preferred, as below; it is slightly more stimulating, and leaves the hair softer and less sticky.

| | | |
|---|---|---|
| ℞ | Tr. cantharidis, | ʒ iiss.–iv. |
| | Ol. amygdal. dulcis, | ʒ ij. |
| | Aquæ cologniensis, | q.s. ad ℥ iij. |
| M. | | |

**Syphilis of the nails** and of the hair are somewhat analogous. If the early eruptions are intense the nails are likely to get thin and lose their lustre, to show more white dots than usual, and to become more brittle and liable to crack. Later in the disease, when the matrix of the nail is more positively influenced by the disease, all of these changes may be more marked, constituting a true *dry onychia*.

In onychia the nail first thins behind at the base. As it grows forward, ridges and furrows are seen upon it, parallel at first, and then converging. The nail, in this way, gets dry, brittle. It looks dirty and cracks easily, and is thin, wavy, and irregular from lunula to tip. This form of onychia is rare, but less rare than another form, in which, instead of thinning, the nail ceases to grow entirely, its tip continues to grow forward, but its posterior edge terminates abruptly in a free, jagged margin. In this manner the whole nail may grow off and be shed. A new nail, perhaps normal, possibly distorted in various ways, ultimately is produced to take the place of the lost nail.

A more common form of dry, syphilitic onychia than either of the above is that in which the nail, usually first at one side of the forward edge, becomes thickened (*hypertrophic onychia*), friable, crumbly, of a dirty, yellowish-white color. The whole thickened surface of the altered part of the nail cracks, fissures, and splits away in pieces, until a portion of the matrix at the side has been left dry and bare. Sometimes a portion only of the nail, sometimes the whole nail, is involved in this process. The nail which is finally reproduced is nearly always normal in structure and appearance.

All the forms of onychia which have been described are dry and painless. The patient usually ascribes them to an injury, but they are not infrequently symmetrical on both hands. They always get well with or without treatment, and their course is invariably very slow.

*Treatment.*—Internal mercurial treatment certainly modifies dry onychia favorably; but the effect of treatment is slow. The five or ten per cent oleate of mercury may be anointed upon the dry, rough nail at night, and the parts protected by a glove finger. Iodides do not exercise so favorable an influence upon dry onychia as mercurials, but, as the affection often comes on at the end of the second year or later, the combination of some form of iodine with the mercurial administered internally is not inappropriate.

*Perionychia* due to syphilis is somewhat more common than onychia, and may be ulcerative or non-ulcerative. A mucous patch may appear under the nail or alongside, and, ulcerating, involve the matrix. Ulcerative and papulo-squamous lesions may grow up to the border of the nail, and include the matrix in a fissure or an ulcer. An ulcer preceded by a small, painful, livid swelling may start at one side of the nail, and run around the border, involving the nail, and causing it to be shed by suppuration of the matrix. Such ulcers are apt to be attended by the formation of exuberant granulations at the borders of the undermined nail. The secretions are retained in such cases long enough to putrefy and become offensive in odor. The whole or only a portion of the nail may come away, and the ulcer which takes its place may eat down into the matrix deeply enough to destroy it. The whole toe or finger may inflame (dactylitis), and the ungual phalanx may be involved in necrosis. When the ulcer is deep enough to involve the matrix to a considerable extent, a healthy nail is not again produced, but, after healing, which always takes place, the nail may be represented by a deformed substitute, or by uneven bands of cicatricial tissue containing varied amounts of nail substance. A gummy tumor commencing in the matrix sometimes occurs, terminating in ulceration, sweeping away the nail, and threatening the whole phalanx.

The *diagnosis* of syphilitic onychia and perionychia is difficult. The onychia in its different forms is, in many cases, difficult to distinguish

from similar conditions produced by eczema and psoriasis. The ulcerative form resembles ingrowing nail, but in the syphilitic disease the matrix is usually involved first, and not secondarily, as in ordinary ingrowing nail, or in common "runaround." The gummy tumor is not apt to be taken for anything else.

The *treatment* of perionychia, and of ulcerated matrix generally, is to keep the parts scrupulously clean by washing with warm water and green soap, by means of a camel's-hair brush; to remove all dead and raised portions of nail (often, with advantage, the whole nail), and to treat the stage of syphilis in which the malady occurs with the remedies appropriate to that stage. The best local applications for the ulcers are iodoform, nosophen, or glutol freely used, black and yellow wash, and the judicious use of poulticing, pressure, and nitrate of silver if the granulations are exuberant.

# CHAPTER XII.

## SYPHILIS OF MUSCLES, TENDONS AND APONEUROSES, BURSÆ, JOINTS AND BONES.

SYPHILIS attacks the muscles by involving their cellular tissue in hyperæmic and hyperplastic changes, or by the formation of gummatous nodules. The function of the muscle is always interfered with while under the influence of the attack. The diffuse hyperplastic form tends to produce atrophy; the gumma destroys the part of the muscle it occupies.

*Hyperæmic myositis* may be, and doubtless is, a mild degree of the diffuse hyperplastic form.

The malady in question appears to involve mainly the lower end of the biceps cubiti. Other muscles also suffer—notably the triceps in the arm. The malady comes on between the sixth and the tenth months, oftener in light than in severe syphilis, and usually in patients who have suffered from pains in the muscles and fibrous tissues previously in the disease. Usually the affection is unilateral, or, if bilateral, of unequal intensity on the two sides.

It comes on insidiously, and advances slowly. Attempts to move the affected muscle cause pain. When the biceps alone is attacked there is inability to straighten the arm completely on account of contraction of the painful muscle. The tendon at the elbow feels prominent and tense. When the triceps is simultaneously involved there is muscular ankylosis.

Untreated, this affection continues for several months—occasionally several years—but gets well eventually, without altering the muscular structure.

The *diffuse form* of connective-tissue hyperplasia is a chronic myositis of specific nature. The substance of the muscle becomes thickened by the development of new cells, which go on to organization into fibres, contract like all cicatricial tissue upon the muscular elements, and in the end lead to atrophy of the muscle, with more or less shortening and loss of function.

In this affection there is no pain, but the muscle gradually shortens, diminishes in size, and becomes more fibrous in texture.

*Treatment* is of advantage in some cases, even after atrophy has commenced. All cases treated early are favorably influenced by a combination of mercury with the iodides.

*Gummatous tumors* may form in any muscle commencing in the peri-

mysium. A gumma here, as elsewhere, consists of a round-celled infiltration, which finally becomes absorbed, or undergoes coagulation necrosis, softens, and finds its way to the surface, acting just as gumma does in the subcutaneous connective tissue.

The *symptoms* are at first only a tumor in the muscle, which is painless, and often of considerable size when first discovered. In a large muscle the tumor is found to be stationary, when the muscle is thrown into contraction; at other times movable. The skin is normal over the tumor until the latter approaches the surface, where it begins to soften, and some pain is complained of, especially at night.

The termination of gumma leads to the destruction of all the muscular fibres involved, which are replaced by the formation of new connective tissue. Prompt treatment alone can arrest destruction of tissue.

The *diagnosis* is possible, in many instances, only by aid of the history and concomitant symptoms, and by the effect of treatment.

*Treatment* with iodides in large doses is generally promptly effective in the earlier stages of gumma. After the mass has softened, it is sometimes incapable of preventing perforation and discharge.

## Syphilis of Tendons and Aponeuroses.

The sheaths of the tendons may become the seat of effusion in secondary syphilis, swelling up in triangular form, with the base toward the fingers, or the effusion may be less generalized. The swelling fluctuates, and usually is unattended by pain. Occasionally, however, pain, heat, redness, and interference with function are as great as in inflammatory tenosynovitis.

The tendons about any of the joints may be involved in this process, but the affection is rare, and the back of the wrist the most common seat.

The tendons and aponeuroses are sometimes involved in localized or diffuse interstitial connective-tissue thickening, and extensive gummata of nearly all the large tendons have been placed on record. Gummata of tendons are painless until they create irritation by their size or by commencing to soften. When they become painful, the muscle from which they spring generally refuses to act.

*Treatment* is that of the stage of the disease to which the lesions belong: mercury internally for the early localized type; mixed treatment for the diffused form; iodides alone for gummata.

## Syphilis of the Bursæ.

The bursæ may be attacked in both the secondary and tertiary stages of the disease, either as an acute bursitis with effusion, which is rare, more commonly by gummatous infiltration. The bursa in front of the

patella is the most frequently involved. The bursa on the side of the knee and that behind the olecranon have been similarly affected. The earlier form of this malady appears much like a bursitis from other causes. Its diagnosis is easy when other phenomena of syphilis coexist, and on account of the fact that it yields to specific treatment.

The gummatous form may remain indolent for an extended period, or, the surrounding tissues having become infiltrated and the overlying skin adherent, the tumor may discharge externally, leaving a superficial ulcer and a sinus leading down to the infiltrated bursal sac, which may persist for a long period. The course of tertiary syphilitic bursitis is very protracted. Concomitant symptoms, study of the case, and its history must be relied upon to clear up the diagnosis.

*Treatment* should be mixed. The effect is much less rapid in the late than in early manifestation. The iodides are more powerful in dispersing the tumor than mercurials, but the combination of mercury with the large doses of the iodides seems to increase the effect of the latter.

### Syphilis of the Joints.

The joints are involved, both in secondary and in tertiary syphilis. The joint affection in the former case is attended by pain, spontaneous and on pressure, and by fever, which may run to such a height as to make the malady assume the form of acute articular rheumatism. There is generally some effusion of fluid. The affection always gets well and yields to mercury.

The acute form may also occur, late in syphilis.

A chronic hydarthrosis, due to tertiary syphilis, without any thickening of the structures forming the joint, is occasionally encountered.

Gummatous infiltration of the small joints, terminating in their disintegration and destruction, sometimes with opening and discharge externally, comes under the heading of *dactylitis*.

The larger joints also suffer in tertiary syphilis, their ligaments, capsule, and the surrounding tissues becoming the seat of gummatous infiltration.

The gummy deposit takes place in the capsule in a diffused form, with localized areas of greater thickening. Together with this thickening of the capsule, there occurs slowly an inconsiderable effusion into the joint. There is no pain early in the disease and no fever.

The malady is usually unilateral. As the changes progress nocturnal pains often set in, and when in the knee the joint assumes more or less of a fusiform shape, recalling white swelling, with which it is ordinarily confounded.

Finally the cartilages soften and disintegrate, gummatous material fills the cavity of the joint. Softening of the gumma takes place and

discharges externally, or even, in the case of absorption, the joint may become disorganized, its functions forfeited, and ankylosis ensues.

The *diagnosis* of this affection is with white swelling. Ordinarily the diagnosis is made by the history and the effect of treatment.

*Treatment.*—Mixed treatment, with the iodides in excess, yields striking results in this malady. The employment of massage and pressure, together with local use of mercurial plasters and of the oleate, assists in the rapidity of the cure.

**Dactylitis.**—This is an important form of syphilis which involves the fingers and toes. It occurs in two forms: the one involving the joint and

FIG. 99.—Dactylitis of the Toe, diffuse form. (After Taylor.)

more superficial tissues, the other the bone and joint. Both are gummatous.

The first form is a diffuse gummy infiltration of the periosteum and subcutaneous tissues. But one phalanx (generally the proximal) may be involved, or the whole digit may share in the morbid process (Fig. 99).

The swelling in this form of dactylitis is firm, ends abruptly, and does not shade off into the surrounding skin. It is not attended by pain except on motion, and the latter is generally interfered with by the swelling. The color of the integument is often a livid, light red, whether there is any eruption upon the skin or not. If the disease is allowed to progress, the ligaments of the joints next become involved. Effusion into the joint is exceptional in this form of disease. Finally, the cartilages erode and the joint is destroyed, the bones becoming implicated at this time.

The course of the affection is slow, and relapse not uncommon. Persistent treatment is always curative, but, if the cartilages have been involved or the joint disintegrated, loss of function necessarily follows.

The other form of dactylitis is a gummy tumor of the bone. One or more phalanges may be attacked. The common seat of the tumor in a typical case is the proximal phalanx (Fig. 100). Effusion may take place

into a joint, and the latter may be involved in the disease even to a greater extent than the intervening phalanx.

The superficial and surrounding tissues often escape implication in an extraordinary way. The skin may be of a livid pink from tension, but

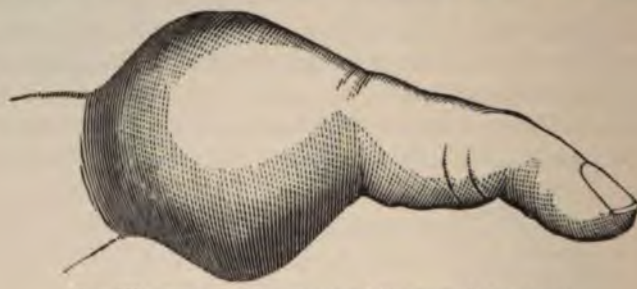

FIG. 100.—Dactylitis of the Proximal Phalanx. (After Berg.)

not at all structurally altered; the nail generally escapes, even when the ungual phalanx is the seat of the disease.

The natural evolution of this malady seems to be that it culminates after a time, and the gummy tissue, not being organized, is reabsorbed without breaking down. Very rarely does the gummy tissue disintegrate and ulcerate its way to the surface. As a result of this interstitial absorption, the bone atrophies visibly and the phalanx shortens. When two bones and an intervening joint have been involved, the shortening

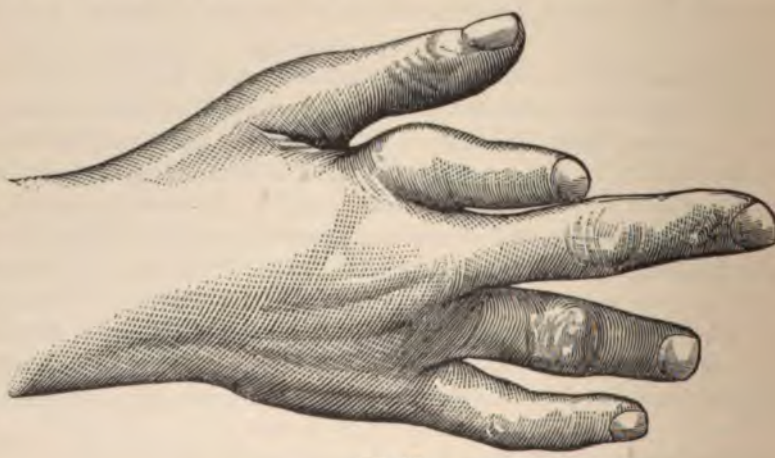

FIG. 101.

due to absorption is so coniderable as to reduce the whole finger greatly in length. The accompanying cut (Fig. 101) illustrates this condition and represents a case of McCready's, pictured also by Taylor. The deformity produced was very striking. There had been no ulceration reaching the

surface in this case, and the functions of the fingers were comparatively good.

When the centre of a phalanx only is involved in the disease, absorption of the gummy material may leave the bone separated in its centre. In such a case the two ends generally come together as a false joint, and the skin over them contracts, so as to conform itself to the new order of things. There is no pain at all, as a rule, in this form of dactylitis.

The *diagnosis* in dactylitis is very easy. The diffuse variety can hardly be mistaken for any other malady. Gout and all ordinary inflammations are too painful to be confounded with it. The second form might be mistaken for enchondroma, which also is painless, and apt to appear upon the phalanges. Enchondroma grows more slowly, and is more circumscribed in area. A close study of the course of the affection will clear up the diagnosis.

*Prognosis.*—Syphilitic dactylitis, even if left to itself, always gets well; but may do so at the expense of deformity and more or less interference with function. Its progress may be arrested at almost any stage by bold and efficient treatment.

*Treatment.*—The diffuse form requires mercury in combination with iodide of potassium or some other iodide, which (the iodide) must be unsparingly pushed as rapidly as the stomach will allow. The second form generally yields a very ready response to the vigorous use of the iodides. The complete success of treatment in any case is slow.

## Syphilis of the Bones.

The bones may be involved in secondary, as well as in late syphilis, the lesion being osteoperiostitis, osteitis, or osteomyelitis—rarefying or gummatous. The epiphyseal changes in the long bones will be noticed under the head of inherited syphilis. Subperiosteal nodes are found in secondary syphilis upon a number of different bones. These nodes, however, are not the destructive gummata of late syphilis; indeed, rather rarely do they go on to the formation of exostoses, the common termination of ordinary nodes in tertiary disease. The secondary syphilitic node is often only a subperiosteal hyperæmia and infiltration, coming on suddenly, perhaps as the result of local injury, disappearing promptly under treatment, and leaving behind no trace of its existence.

Some few of the secondary subperiosteal swellings, however, do lead to local thickening of bone, which remains permanent.

*Osteocopic pains* commonly occur in secondary syphilis, and often in late syphilis as well. They are pains of a splitting, boring character, coming on at night in certain bones, sometimes with great regularity ceasing toward morning. These pains are probably due to slight periosteal swelling, attended by considerable subperiosteal hyperæmia. The

warmth of the bed seems to intensify them (Ricord). Rarely the pains come on by day, and cease by night.

They occur about the head and neck, the shoulders, elbows, and knees, and in the continuity of the long bones. The previous use of mercury has nothing whatsoever to do with their causation; on the contrary, they are not apt to come at all if mercury has been commenced early enough, and they disappear more quickly under the use of mercury than under the employment of any other drug.

In connection with the pains, sometimes when the bone is superficial (cranium, tibia), the periosteum is apparently raised a little, and gives to the fingers an obscure sense of œdema.

The night headache of early syphilis is usually an intense osteocopic pain.

Osteocopic pains early in syphilis are favorably influenced by both mercury and the iodides, but mercury has decidedly the more power over them. When the pains are only moderate, they do not call for any deviation from the general treatment which the stage of the disease calls for in which they occur. When they are intense, however, mercury in minute doses, frequently repeated, will sometimes relieve them very promptly. From one-fifteenth to one-tenth of a grain of calomel may be given in this treatment hourly for twelve hours. Then it is well to arrest treatment for one day, and repeat a similar course on the next. The object of interrupting treatment is the fear of salivation or of intestinal disturbance, of which there is some danger when this method is pushed in susceptible cases.

When osteocopic pains come on in late syphilis, they generally indicate a tendency to serious disease of bone, and call for the iodides in large doses. The mercurials are also of advantage here, but the iodides outrank them.

**Osteoperiostitis.**—The *syphilitic node* is an inflammatory osteoperiostitis, terminating generally in new formation of bone. The lump thus formed is raised over a variable area in rounded form, which gradually shades off into the surrounding tissues. This lump is soft, and at first quite painful, especially upon pressure. Manipulation proves it to be attached to the bone. The skin over it is freely movable, and not discolored. There is often œdema, especially in young nodes of large size. The pain in these nodes is sometimes considerable, especially if they are situated on the shin, and if the patient walks or stands much. The pain is quite certain to be intensified at night.

The bones most often involved are the flat bones (cranium) and superficial bones (tibia, clavicle, ulna). Local injury, a blow, will sometimes cause a node to appear, but neither situation nor local violence is necessary for their production, for they sometimes grow from the inner table of the skull, where they cause great damage by pressure, and they are

occasionally found upon a deep-seated bone (femur, vertebral column) well down among the muscles.

The date of appearance of nodes is late in syphilis. Early forms do occur, as already mentioned; but they are not important, and generally disperse, leaving no trace.

Their course is generally slow. After remaining soft for a varying period, they become firmer, and gradually disappear by absorption under treatment. Occasionally a node softens centrally, the skin over it becomes involved, red, adherent. The softened node discharges and a syphilitic ulcer remains, the floor of which is bone denuded of its periosteum. This bone becomes black or brown where it is exposed, and often a superficial flake necroses, separates in due time, and comes away, after which the ulcer heals. On the skull the outer table comes away generally, the inner table remaining, perhaps perforated by a number of holes through which the dura mater may be seen and felt.

Sometimes a node will remain as a hard, fibrous lump, perfectly painless and as solid as wood for a number of years, causing no inconvenience. Such a node, after existing for years, may suddenly soften and melt away, involving the bone in destruction, large portions of the superficies of which necrose in the floor of the ulcer which after healing leaves a white, puckered, adherent cicatrix, often pigmented at the circumference.

*Exostoses.*—Finally and most commonly, a node, having existed some time, undergoes partial transformation into true bone (*formative osteitis*). Such new formations of bone cannot be removed by treatment. They remain permanent; but after a time lose their sensitiveness and constitute *simple exostoses.* These exostoses on the inside of the skull may occasion dangerous symptoms, such as paralysis and convulsions.

The form of bony outgrowth due to syphilis, which is at first more or less movable and later becomes attached, has been called *epiphysary exostosis.* It is an irregularly shaped ridge or prominent pedunculated bony formation occurring about the epiphysary ends of long bones, recalling the outgrowths seen in rheumatic gout.

Besides periostitis there may be a general *rarefying osteitis* (usually of a long bone) involving a portion or the whole of a bone in a painful general thickening due to round-cell proliferation in the subperiosteal tissue, and cellular infiltration within the osseous canals.

The *diagnosis* is not difficult. The course of the growth, and particularly the nocturnal pains, suggest a search for a syphilitic history, and put the physician on the right track to discover the nature of the affection.

The *treatment* of osteoperiostitis and rarefying osteitis is that of late syphilis.

**Gumma of Bone.**—A gummy tumor late in syphilis may form anywhere in a bone—under the periosteum (gummatous osteoperiostitis) or in the medullary tissue (gummatous osteomyelitis).

The subperiosteal gumma is found chiefly upon the clavicle, skull, sternum, ribs, tibia, ulna. It commences like a node and tends always to soften, while the less active node tends naturally to remain organized. The gumma is an acute process, like the osteitis and periostitis already described, but much more active. Consequently, it is more serious, more destructive.

The gumma, commencing like a node and advancing rapidly, softens, attaches itself to the skin and discharges, its puriform débris remaining as an ulcer with dead bone at the bottom. Instead of discharging, gumma of bone may remain a soft mass for a long time and undergo caseous degeneration.

Gumma of the medullary membrane in the long bones is uncommon. The whole bone swells, and finally gives way. Ultimate atrophy of the portion of bone involved is to be expected.

Medullary gumma of the short bones is not very uncommon. A type of such formations already described is seen in dactylitis.

The diffuse thickening of bone, referred to in connection with syphilitic osteoperiostitis, is often a gummatous process, the connective tissue around the vessels permeating the bone, in the Haversian canals and canalicules, being the matrix in which gelatinous, gummatous hyperplasia occurs, afterward drying up and being absorbed, leaving the enlarged bone very porous, or remaining degenerated in the form of cheesy deposits.

In the flat bones, and particularly in the diploë of the skull-cap, syphilitic gumma takes the form of an infiltration, widening the bony lacunæ, cutting off the vitality of the thin plates of bone involved, and, by its gradual increase, separating the two plates of condensed bone from each other. Finally, a piece of condensed bone may die and gradually exfoliate. The external table of the skull over a considerable area may perish in this way (Fig. 102). Eburnation, condensation, and thickening of bone take place here as elsewhere with more or less tendency to osteophytic and hyperosteal formations. Sometimes the inner table of the skull necroses in connection with diffuse gumma of the diploë, leading to changes in the dura mater and brain, and to the most serious nervous symptoms.

When the very thin bones are attacked by gummatous changes they ulcerate and in part necrose, portions of dead bone coming away entire. This is the rule in the case of the thin bones of the nose, palate, etc. The bones of the nose are peculiarly liable to destruction from syphilitic processes.

As secondary results of the changes in bone produced by syphilis, besides *necrosis*, *caries*, and *hyperostosis*, may be mentioned a fragility of the porous bone, rendering its fracture very easy and its repair slow and imperfect. Damage may be caused through pressure, by hyperostoses, upon soft parts, cranial nerves, spinal nerves, and the eye in orbital exostosis.

Finally, it is necessary to emphasize the fact that mercury has nothing to do with disease of the bone.

Mercury given in excess to the point of salivation may, and certainly does, threaten the maxillary bones, especially the alveolar process, with destruction; but aside from this, mercury does not cause any symptoms which might be, and usually are, produced by the poison of syphilis.

*Treatment.*—As a rule, all forms of bone disease, from the painful spot to the gumma, respond to the iodides. The treatment is that of

FIG. 102.

late syphilis. Mercury is beneficial in the osteocopic pains and all lesions occurring early in the disease.

## SYPHILIS OF CARTILAGE.

When a joint is involved, or syphilis attacks the expanded end of a bone capped by cartilage, the latter naturally softens, becomes eroded, and is destroyed by the neighboring disease. The fibro-cartilage of the ear is often invaded by an ulcerative, tubercular syphilide starting in the superficial tissues. The laryngeal and tracheal cartilages are a very common seat of syphilitic perichondritis, occasionally gummatous deposits involve their vitality, and portions of the cartilage may fall into necrosis, just as a bone does under similar circumstances. Gummata upon the costal cartilages act like the same lesions on bone. The intervertebral fibro-cartilages are sometimes involved in gummatous processes, but rarely so.

# CHAPTER XIII.

## SYPHILIS OF THE VISCERA.

### The Respiratory System.

In the nose, in early syphilis, erythematous lesions and mucous patches are apt to occur. Their symptoms are those of catarrh. Young people suffer more than adults from nasal symptoms, and babies with inherited disease most of all. The mucous patch and the erythematous lesions have the same physical characteristics here as they have in the throat.

In tertiary syphilis, gummatous ulcers upon the mucous membranes of the nose involve its cartilages below and its thin bones above in destruction; and gummy tumors are quite certain to destroy the bridge and other portions of the bones of the nose unless arrested by treatment. After cure, the bridge of the nose is permanently sunken and its point turned up, giving a physiognomy which is almost pathognomonic of late syphilis.

While the destructive process involving the bone is going on within the nose, the patient has "syphilitic ozæna," or, catarrh, which is more or less purulent in character. The odor of the breath in these cases is peculiarly offensive. The inside of the nose contains yellow and black dry scabs closely adhering to ragged ulcers, or to perforations through the septum or elsewhere. Pieces of dead bone are frequently discharged through the nostrils, or remain as sequestra and keep up the local irritation. The nasal duct often gets shut up, leading to abscess of the lachrymal sac, conjunctivitis, necrosis of the lachrymal bone. The Eustachian tube may be closed, and inflammatory trouble in the middle ear be set up, leading to deafness.

If the disease is situated high up in the nasal cavity, the olfactory sense may be destroyed or temporarily impaired.

The *diagnosis* of the lesions above described rests upon their course, clinical characters, and syphilitic history.

The *treatment* of lesions of the nasal cavity is that of the stage in which they occur. Local treatment for the early erythematous lesions should be stimulating. In the late stages the nasal cavity should be cleansed with an antiseptic spray and loose pieces of dead bone should if possible be removed.

**The Larynx.**—The mucous membrane of the larynx suffers from ery-

thematous and mucous patches in early syphilis. These lesions are the same here as elsewhere on the mucous membranes (see page 284). They are the better for local treatment, but get well without it. Mercurial inhalations sometimes hasten their disappearance.

In the tertiary stage chronic inflammation attacks the cartilages of the larynx, and deep ulcerations appear upon the mucous membrane, the vocal cords, and in the muscles of the larynx.

*Non-ulcerative laryngitis* due to syphilis is a chronic, constructive, connective-tissue hyperplasia, involving the cords as well as all the tissues within the larynx. The newly formed material contracts here as elsewhere, binds and draws together the tissues within the larynx, stiffens the vocal cords into unyielding rigidity in the closed state, and, finally, may obstruct respiration entirely, no previous ulceration having occurred. The cartilages do not become necrotic in this affection, and there is no loss of tissue, except of muscular tissue by atrophy from pressure.

The *symptoms* of this affection are a hoarseness, lasting for months, even years, slight pain on pressure, gradually increasing dyspnœa, the voice finally being reduced to a whisper, the patient becoming enfeebled, cyanotic, and emaciated. The larynx is stenosed, the mucous membrane livid, the intralaryngeal tissues are thickened. Rapid œdema of the glottis is liable to come on at any time.

The *diagnosis* should be made by direct examination with the laryngoscope. In tuberculous laryngitis there is generally consolidation at the apex of the lung, and with the laryngoscope surface ulceration in the larynx may be detected, if present. Papilloma of the vocal cords which may give all the symptoms of syphilitic laryngitis is distinguished in the same manner.

*Treatment* is mixed—mercury with the iodides. It must be long continued. If commenced early, it is promptly curative; later, it is slower in its action and less effective. In the stage of stenosis, tracheotomy is sometimes necessary to relieve impending suffocation.

*Ulcerative laryngitis* may accompany the affection last described, or occur independently of it.

The ulcers are like tertiary, gummy ulcers of the pharynx, and may occur anywhere within the larynx, on the cords, behind the epiglottis, running down in connection with ulcers in the throat, or occurring independently.

The ulcers may start as in the pharynx, upon the surface and eat in, or a gumma may form beneath the perichondrium of a laryngeal cartilage and eat outward, in either case, especially the latter, a portion of the cartilage is liable to be involved in necrotic changes and to exfoliate. A gumma of the larynx may work its way out externally, giving rise to fistula.

The ulcers, surrounded by considerable œdema, are visible with the

laryngoscope. The final cicatrization after cure in these cases may lead to the most extensive distortion of the laryngeal cavity, or even to its obliteration.

The *symptoms* are those of chronic laryngitis intensified. Pain is common, with expectoration of pus, mixed perhaps with blood and portions of sloughy tissue.

*Diagnosis.*—The symptoms easily localize the disease, and the diagnosis lies between ulcerative tuberculour laryngitis and destructive cancerous laryngitis. In the former affection the lungs will almost always be found to be in an advanced state of tuberculour disease, and in the latter, the non-ulcerated masses of new growth can often be seen with the aid of a laryngoscope and the diagnosis confirmed by microscopic examination.

*Treatment.*—Iodide of potassium should be given in large doses, and run up as rapidly as the stomach will stand. Tracheotomy may be called for on account of impending suffocation from œdema. Cicatricial changes are not favorably affected by treatment, and may be so seriously obstructive to respiration as to demand tracheotomy and a permanent tube.

**The Trachea, Bronchi, and Lungs.**—The trachea and larger bronchial tubes are subject to the same morbid conditions as the larynx, but less commonly so. The lesion found in syphilis of these regions consists of dense inflammatory connective-tissue hyperplasia, accompanied by ulcerative changes and more or less resultant narrowing (stenosis) of the tubal lumen. It is possible for ulcers on the surface to eat through into surrounding structures, but such accidents are exceptionally uncommon.

The *symptoms* consist of more or less dyspnœa, localized pain, and varying lung symptoms, such as cough, râles, expectoration of mucus or blood, etc. If the lesion be tracheal the voice is more likely to be impaired.

The *diagnosis* is with tuberculous troubles, and rests mainly upon the history and concomitant symptoms, and the examination for tubercle bacilli.

The *treatment* is like that for similar conditions in the larynx.

**The Lungs.**—The lungs are affected by syphilis in two ways: in the form of diffuse connective-tissue hyperplasia, leading to consolidation by interstitial changes; and in the form of gummy tumor.

*Syphilitic pulmonary fibrosis* is very common in inherited disease. It is often generalized in both lungs in the infant. In the adult it is more commonly circumscribed. The change in either case is an interstitial thickening of the connective tissue between the air cells, which may go on to a total obliteration of the latter in the fibroid transformation of the new cells, and sclerotic shrinkage of the morbid tissue.

The portions of lung involved in the disease are stiff, non-crepitant upon pressure, solid, depressed below the level of the surrounding lung. They cut like fibrous tissue; the section is seen to be interspersed with

yellow points of fatty degeneration, and the bronchial tubes, variously dilated and contracted, with thickened walls. The pleura over these spots is apt to be involved in the thickening.

The *symptoms* of pulmonary fibrosis are not pathognomonic. They are identical with those of chronic phthisis. Any portion of the lung, apex or base, may be involved, and there are usually the accompaniments of fever, short breath, cough, expectoration, emaciation, etc.

*Gummata in the lungs* may coincide with fibrosis, or come on independently. They necessarily go on to destruction of the tissues they implicate.

There are no fixed symptoms. The tumor is solid at first, and may be made out by percussion, if it is large enough. It may suppurate, and discharging into a bronchus, leave a cavity which may be revealed by physical signs. There is no pain, and the subjective symptoms are not at all distinctive.

The *diagnosis* of lung syphilis always rests mainly on the history, the result of treatment, and the examination for tubercle bacilli and is consequently for the most part tentatively experimental.

*Treatment* may be rapidly effective of relief—a permanent cure is possible. It should be mixed, with large doses of iodide and continued for a long period.

## The Digestive Tract.

The secondary and tertiary lesions of the buccal cavity and pharynx have been described already.

**Sclerosis and Gumma of the Tongue.**—Sclerosis of the tongue occurs in two forms. One superficial, in which the mucous and submucous tissues are involved in a general or circumscribed thickening resembling cicatricial tissue, which may or may not be accompanied by ulcerations. The deeper form of sclerosis, which is an extension of the superficial lesion, results in local or general thickening of the tongue, the size of which may be very great. A lobulated condition is produced which is quite characteristic. The lobules are separated by fissures of which the central fissure is the most pronounced, as this process is deep and extensive the body of the tongue is felt to be indurated as well as enlarged. The mucous surface is changed in color, being either red, pale or dirty white. It is generally smooth. Ulcerations may be present as a result of irritation or abrasion caused by the teeth. Cases are also reported of partial and localized atrophy of the tongue due to syphilis.

Gummatous lesions of the tongue are especially important and worthy of study, because they frequently come on after all evidences of syphilis have disappeared, and are suggestive of epithelioma.

A gumma may commence in any portion of the tongue except its under surface, and may be encountered at any time of life. Not very

infrequently it is bilateral, or there may be multiple foci of gummatous deposit. The gumma commences without any pain, as a lump deep among the muscles of the tongue or under the mucous membrane; never superficially at first, like an epithelioma. The lump grows, the mucous membrane over it becomes stretched and livid, finally the tumor softens centrally, ulcerates its way through the mucous membrane, and remains open as a gummatous ulcer, with a deep, sloughy cavity, hard base, fissured, ragged, thick, abrupt borders, often undermined at first, but always bound down and adherent later on. The ulcer progresses slowly. The course of the affection in any case is much protracted, but the tendency is to ultimate self-limitation, even without treatment, if the general health be good; and to cicatrization, with more or less loss of tissue, according to the extent and duration of the ulcer.

The discharge is slight, even when the ulcer is at its height; but there may be phagedæna. Pain is absent or inconsiderable, and the functions of the tongue are not much disturbed. The lymphatic glands escape implication, or are involved only in an inflammatory way. The general health may be very little disturbed, or there may be marked cachexia.

The *differential diagnosis* is with epithelioma of the tongue, and with tuberculous ulceration. Tuberculous ulcers commence as white excoriations without antecedent tumor. The excoriations enlarge and deepen. They advance slowly and are very obstinate and hard to heal. Nearly always the lungs contain other evidences of tuberculosis.

The differential diagnosis between epithelioma and gumma of the tongue is presented in the following diagnostic table:

| ULCERATED EPITHELIOMA OF THE TONGUE. | ULCERATED GUMMA OF THE TONGUE. |
|---|---|
| 1. Occurs generally late in life. | 1. Occurs at any age. |
| 2. Possible cancerous antecedents. | 2. Syphilitic history. |
| 3. The ulcer sometimes occupies the seat of former ichthyosis of the tongue. | 3. Nothing of the sort. |
| 4. Commences superficially and ulcerates. | 4. Commences deep in the tissues, feeling like a bullet beneath the mucous membrane. It softens centrally, and on reaching the surface discloses a deep ulcer. |
| 5. Lesion is unique. | 5. Sometimes multiple and bilateral. |
| 6. Occurs on any part of the tongue. | 6. Found only on the back and sides of the tongue, never beneath. |
| 7. Edges everted, tuberculated, irregular, bleeding easily when touched, or spontaneously. | 7. Edges abrupt, uneven, hard, adherent, covered with slough, not tuberculated, not bleeding easily. |
| 8. Discharge free, ichorous, putrid. | 8. Discharge slight. |
| 9. Pain spontaneous, shooting toward ear (Fournier). | 9. Ulcer usually painless. |

| ULCERATED EPITHELIOMA OF THE TONGUE. | ULCERATED GUMMA OF THE TONGUE. |
|---|---|
| 10. Tongue rigid, painful, functionating badly. | 10. Functional troubles generally light. |
| 11. Microscopic characters those of epithelioma. | 11. Microscopic characters those of a degenerating gumma. |
| 12. Lymphatic glands become involved. | 12. Lymphatic glands generally remain exempt. |
| 13. Antisyphilitic treatment of no value. | 13. Antisyphilitic treatment generally promptly beneficial. |
| 14. Termination: death by cachexia and inanition. | 14. Spontaneous cure without medicine possible. |
| 15. Liable to return if cut out. | 15. Does not return if cut out entirely. |

*Treatment.*—Gumma of the tongue usually yields a rapid response to iodide of potassium in large doses, if the remedy is given before the tumor has softened. After ulceration, the effect of treatment is less rapidly effective, but, nevertheless, is generally quite prompt. In cachectic conditions, and when the stomach will not bear the iodides, the result of treatment is slow and often unsatisfactory.

**The Œsophagus.**—Gummatous deposits may originate in the œsophageal walls leading to ulceration and eventually to stenoses from cicatricial contraction.

These lesions are very rare. Their symptoms are pain on swallowing, with evidence of some obstruction in the canal. When the ulcers get well, the resulting stricture calls for treatment by dilatation, severe cases may require gastrostomy. Specific treatment if begun early enough may forestall the formation of stricture, but will not cause its absorption when once it has formed.

**The Stomach and Intestines.**—Early in syphilis, especially during the fever, nausea, indigestion, and other functional troubles of the stomach are not uncommon.

Thickening and ulceration of the stomach have been ascribed to tertiary syphilis, but have not been clearly defined. Presumably these lesions occur here as they do in other portions of the alimentary canal, but they are more likely to be discovered on the post-mortem table than they are to be recognized during lifetime.

Gummatous ulcers occur both in the small and large intestines. Cases have been reported by various observers (Oser, Meschede, Wagner, Blackmore, and others), the lesions having been found after death. Such ulcers may be single or multiple and result sometimes in perforation, followed by fatal peritonitis. Continuous diarrhœa with occasional bloody stool and colicky pains with the coexistence of a syphilitic history and visible lesions elsewhere, would naturally lead to the suspicion of the existence of such lesions.

*The Rectum.*—In early syphilis there may be ulcers upon the mucous

membrane of the rectum and anus which behave like syphilitic ulcers elsewhere. They are generally surrounded by an unusual amount of inflammatory œdema.

*Condylomata lata* appear upon the integument of the arms and around the genitals. They are mucous patches which grow from the skin instead of the mucous surface. They commence as small moist papules and become elevated by infiltration when they present the characteristic appearance of flat warty excrescences (Fig. 89, page 286).

Localized or diffuse gummatous infiltration and ulceration constitute another form in which the disease appears in the rectal region. A stricture produced by this condition may be of only temporary duration. It may disappear under treatment.

Finally there occurs a *chronic hyperplastic infiltration* into the submucous tissue of the rectum (ano-rectal syphiloma of Fournier), dependent upon active cellular proliferation. This lesion is slow in forming. Eventually the new tissue becomes fibrous in character and contracts, producing a dense fibroid stricture without previous ulceration. Ulceration may occur concomitantly, but is not an essential part of the malady. The symptoms are those of proctitis with some loss of power in the sphincter, followed later by difficulty in defecation, small stools, and constant mucous discharge. This condition when fully developed is a permanent one.

*Diagnosis.*—When ulceration has preceded stricture of the rectum, it is difficult to differentiate the chancroidal form from that occasioned by ulcerated mucous patches.

The true fibroid stricture is more easily recognized. No other malady produces the livid, flat, softish, semi-elastic external patches extending into the sphincter and weakening its power, attended by the denser infiltration higher up, with little or no surface ulceration and comparatively little pain.

*Treatment.*—In all the tertiary syphilitic affections of the digestive tract dietary expedients and precautions are essential. The effect of mercury in all of these conditions is good hypodermatically or by inunction; but it may be necessary to administer the drug so as to spare the stomach and intestines as much as possible. The iodides should be combined with the mercurial treatment in mild doses and pushed with caution, largely diluted with water.

Mucous patches and ulcers, whenever they occur, demand absolute cleanliness, washing with green soap and warm water, and careful drying. The surfaces may then be dusted with powdered calomel, iodoform, or nosophen.

For ulcers within the rectum suppositories of iodoform, from four to eight grains, should be inserted once or twice a day. For sluggish or phagedenic ulcers antinosin, the sodium salt of nosophen, is applicable. In syphilitic stricture of the rectum enemata are better than laxatives.

When the contraction is produced by fibroid changes in the wall of the gut, the bougie is indispensable; and in the last stage of unyielding fibrous contraction the knife or electro-cautery alone offers a chance of cure and holds out hope of comfort to the patient.

**The Peritoneum.**—Syphilis does not appear primarily in the peritoneum. In connection with syphilitic (especially gummatous) changes in the liver, spleen, intestines, ovaries, the peritoneum becomes thickened and adherent.

**The Pancreas.**—This gland as a result of syphilis has been found by Lancereaux and others, after death, to be the seat of connective-tissue infiltration and gummy tumors.

**The Liver.**—The jaundice sometimes attendant upon the early symptoms of syphilis is due to catarrh of the bile ducts.

The changes in the liver due to syphilis later in the disease are true to the two types of syphilitic tissue alteration: the one constructive—a diffuse, cellular hyperplasia, ending in contraction and induration; the other destructive—the gummy tumor. Amyloid changes in the liver are also ascribed to syphilis.

*Diffuse syphilitic hepatitis* occurs in a circumscribed form in the liver of adults with acquired syphilis. It goes on to final atrophy and cirrhosis, the cicatrix formed by the wasted tissue contracting deeply into the organ gives it a nodular and irregular surface, the liver tissue jutting out between the puckered, contracted spots in a singular manner. The tissue in these limited glandular areas may be normal, or in *amyloid degeneration.*

The peritoneum over the depressed cicatricial areas occupying the sites of old disease is generally thickened. Sometimes the two layers of peritoneum are adherent.

*Gummatous hepatitis* occurs as a dense, connective-tissue, radiate mass, with cheesy deposits scattered through it, or as a round, cellular tumor, degenerated at the centre, and separated from the liver substance by a capsule formed of condensed connective tissue. Gummata commence in the walls of the vessels between the lobules. They thus envelop the lobules, which they destroy. They may be solitary or occur in great numbers, and of varied size, interspersed through the organ.

*Symptoms.*—The changes in size of the liver due to hepatitis may be appreciated by percussion. Inequalities due to extensive cicatricial puckering of the organ may sometimes be made out by palpation. Symptoms in connection with syphilis of the liver are very moderate or absent altogether, the lesion or its cicatrix being encountered after death. Pain may be complained of, dull or severe, sometimes made worse by pressure, especially where there is perihepatitis. Jaundice is the exception rather than the rule, but sometimes comes on and lasts long. It may be due to pressure of the enlarged abdominal lymphatic glands.

Albuminuria and cachexia often accompany syphilitic degenerative changes of the liver. When these two symptoms coincide with an irregularity of form and indurated lumps, or a fissured edge of the liver, which may be felt, the diagnosis of syphilis is readily made.

*Treatment* is that of late syphilis—a mixed medication with a preponderance of the iodides, especially if there be reason to suspect that the lesion is gummatous.

**The Spleen.**—The common varieties of textural changes which are produced in the spleen by syphilis are chronic interstitial infiltration and gummatous nodules. The former occurs as a diffuse, connective-tissue, cellular hyperplasia, going on to the formation of fibrous tissue which contracts and leaves depressed spots, with the peritoneum over them adherent to neighboring organs.

The gummata are fibrous nodules of varying size, granular and degenerated centrally; pinkish-gray at first, finally a dirty yellowish-white.

Amyloid degeneration may be seen in connection with similar changes in the liver and kidneys.

*Symptoms.*—There are no symptoms of these lesions other than the enlargement of the spleen due to syphilis which is sometimes recognizable.

**The Thymus, Suprarenal Capsules, and Abdominal Lymphatic Glands.**—The thymus, as a result of syphilis, has been found hardened, enlarged, broken down centrally, the seat of diffuse connective-tissue hyperplasia, and of gumma.

Connective-tissue infiltration and gummatous degeneration of the suprarenal capsules are met with in acquired syphilis.

The abdominal lymphatic glands are subject, in late syphilis, to considerable enlargement and to gummatous deposits, which may atrophy or become cheesy; or may soften and discharge, generally upon the cutaneous surface, leaving ulcers and fistulous channels of varying extent and duration. The pressure of these larger glands may interfere with digestion or give rise to jaundice.

Such glandular swellings may be diagnosticated when they can be felt, and are best treated by the iodides, with a certain amount of mercury by inunction.

## The Vascular System.

**Syphilis of the Heart.**—A diffuse pericardial thickening and gumma of the pericardium have been occasionally noted after death.

Diffuse parenchymatous myocarditis also occurs, and most often either with the diffuse cellular infiltration or independently as gumma of the muscular structure.

The thick wall of the left ventricle is the most common seat of the deposit.

Anatomically, the gumma of the heart is a collection of small round cells, encapsulated and yellowish-white on section, often cheesy at the centre. If near the surface, the pericardium or endocardium over them is thickened. They are often multiple.

A general weakening of the heart's action, without any valvular irregularity, attended by slight enlargement of the organ and dilatation of its cavities, seems to be the only symptom upon which a diagnosis can be based. There may be also functional disturbances, such as palpitation, dyspnœa, headache, and vertigo.

The possibility of embolism, due to bursting of a softened gumma into the cavity of the heart, must be remembered.

*Treatment* is mixed, with preponderance of the iodides.

**Syphilis of the Arteries.**—The changes in the large vessels which are most common are atheromatous deposits; and these, when they are found in a syphilitic subject early in life, before they can be accounted for by senile changes, are generally set down as being due to syphilis.

A diffuse general thickening of the arterial wall, commencing as an endarteritis, and sometimes going on to the extent of occluding the lumen of the vessel, is a process very common among the small arteries in syphilis, especially the arteries of the brain (Heubner). The walls of the blood-vessels large and small are the common seat of gummatous tumors.

As a consequence of a syphilitic artorial changes brain symptoms are not uncommon, due to a cutting off of a portion of the brain from its blood supply on account of partial or entire closure of the lumen of an artery through thickening of its walls. Aneurisms are much more common upon syphilitic patients than upon others.

There are no positive diagnostic signs by which the syphilitic nature of a presumed or a positive arterial change can be established. When such changes occur upon a syphilitic subject, a mixed treatment, with a preponderance of the iodides, is indicated. The effect of treatment upon arterial lesions is not always brilliant, but often it is of enough value to make it well worth while to push it with firmness and continue it with patience.

The effect of syphilis upon the *veins* is quite similar to that produced upon the arteries in both early and late stages.

# CHAPTER XIV.

## SYPHILIS OF THE NERVOUS SYSTEM.

SYPHILIS of the nervous system has in large part passed from the domain of syphilography to that of nervous diseases; and to-day the patient with nervous syphilis turns instinctively to the neurologist. The subject is too extensive to receive in this work the full attention it merits; an endeavor will be made, however, to give a brief exposition of the most important facts.

*Causation.*—Certain points in the etiology of nervous syphilis deserve mention. It is now known, contrary to the older teachings, that the nervous system is attacked most frequently within the first three years after the original infection. A considerable number of cases occur within six months of the chancre. After ten years the danger becomes much less. The most systematic and careful treatment in the early stages does not procure absolute immunity for the nervous system. It seems probable, however, that thorough treatment diminishes the danger; and this statement receives some support from the currency of the theory that nervous symptoms develop most frequently when the early general symptoms were slight and transient—in other words, in the cases in which treatment is most apt to be neglected. There is little authority for the belief that the nervous system is involved with special frequency when the chancre is extra-genital. It has been estimated that of all syphilitics, from one and one-half to two and one-half per cent develop lesions in the nervous system, exclusive of those of locomotor ataxia and general paresis.[1]

Alcoholism, lead poisoning, fatigue and over-exertion, undue exposure to the sun or high degrees of heat are among the most important exciting causes. Brain syphilis is especially frequent in persons of unusual intellectual activity; and in the so-called Bohemians, who lead lives of irregularity or excess.

When the affection of the nervous system is hereditary, it usually appears in the first two years of life, though it may do so at later periods.

*Pathology.*—The anatomical characteristics of syphilis of the central nervous system are changes in connective tissue and in the blood-vessels. They sometimes originate in the surrounding bones and extend to the brain or spinal cord; more frequently, however, in the nervous system it-

[1] A percentage which to the authors seems excessively high.

self. In connective tissue they appear as collections of round, polyhedral, and branching cells, which may be diffused or gathered together in masses. These masses are microscopic, or appear as very small dots, or may attain the size of large tumors. They are the gummata. They are soft, yellowish, poorly supplied with blood-vessels, and have the tendency to central necrosis. The changes in the blood-vessels are most important in the arteries. Their external coats are thickened and infiltrated with round cells, often collected as minute gummata. The endothelial cells of the intima proliferate, encroaching upon or obliterating the lumen of the

FIG. 103.—Cerebral Syphilis. The upper short line points to an eroded aneurism of the basilar artery.

vessel (obliterating endarteritis). This affection of the arteries may be limited to the small vessels in the immediate vicinity of the gummatous deposit, or it may involve large and important trunks which are adjacent.

It also occurs in the larger vessels of the brain, especially in the middle cerebral, as an independent and primary affection, constituting primary cerebral arteritis, perhaps the most important form of nervous syphilis.

These pathological products may be circumscribed or scattered throughout the cerebrospinal axis. They have the tendency to spread, causing adhesions of the membranes to each other and to the surrounding bones, and to the nerves. Most frequently the new tissue involves the meninges primarily—the internal surface of the dura and the meshes of the pia especially. In the brain the pia is affected most frequently at the base,

the space bounded in front by the optic chiasm, behind by the pons, and at the sides by the crura. This is the basal meningitis. The internal surface of the dura suffers chiefly over the convexity. This occurs as a local or diffuse pachymeningitis. Solitary gummata also proceed from the dura.

FIG. 104.—Gumma of the Dura Mater of Spinal Cord.

The primary involvement of the internal parts of the brain is more unusual. Still, solitary gummata occur in the white matter of the hemispheres, in the basal ganglia, and (infrequently) in the cerebellum.

In the spinal cord, the commonest manifestation of syphilis is a meningomyelitis of the dorsal region. Others are gummata of the internal surface of the dura and cervical pachymeningitis. Solitary gummata of the cord are rare. The blood-vessels in the neighborhood of the gummatous deposits are always involved; but primary spinal arteritis is very much less common than the cerebral form. The cranial nerves are usually affected by extension of a surrounding meningitis. The existence of peripheral neuritis due to syphilis is doubtful. In addition to these changes wrought by syphilis in the central nervous system, of an inflammatory and comparatively gross character, are atrophies and dystrophies of the ganglion cells. Of these latter little is known.

Syphilis acts upon the central nervous system in three ways: First, the effect on the organism of the poison itself, the reaction to which is shown by the pathological alterations in connective tissue, blood-vessels, and nerve cells. Of this we know very little. Second, the newly formed tissue acting as a foreign body, disturbing the function of conducting paths and of nerve cells. These effects are generally not complete, though in the case of large gummata they may be serious or fatal. The third and most important effect of syphilis upon the central nervous system is obtained through the arteries. Anæmia of important parts of the brain is brought about by narrowing of the nutrient vessel through its thickened intima or by thrombosis. If the circulation be not completely shut off, or if it be quickly resumed, complete restoration of the affected brain region is possible. But when the anæmia is complete or long continued, the tissues soften and disinte-

grate, a condition from which repair is impossible. In a small proportion of cases aneurisms form which may rupture. The basilar artery is the most frequent site (Fig. 103).

### Cerebral Syphilis.

*General Symptoms.*—Certain general symptoms are found more or less constantly in all varieties of brain syphilis, and they are in many ways characteristic. The mental state, while it may be maniacal or comatose or normal, is often that of inattention, of sleepiness, or dreaminess. The patient hears, understands, and can answer; but he is quiet and sleepy and uninitiative; he is subconscious and sleepy rather than stupid. Headache is an almost constant symptom. Its location and character vary with the anatomical lesion, but it is almost always worse at night. The condition of the pupils may be of great assistance in diagnosis. They are often unequal in size, although both respond to light. In other cases there is the Argyll-Robertson pupil, *i.e.*, response during accommodation, but not to light. In other cases all pupillary responses are lost.

In addition to these general symptoms there may be those common to any brain disease. Thus vomiting, dizziness, epileptic attacks, etc., are frequently met with. Objective sensory symptoms are rare. The patient may complain of numbness or tingling down one side, but it is not often that anæsthesia is demonstrable.

A distinguishing characteristic of all the symptoms of cerebral syphilis is their fluctuation. They become worse and better by turns; they advance and retreat; they have a strong tendency to relapse.

The special clinical forms under which brain syphilis manifests itself are in many ways characteristic and cleanly cut. But it must be remembered that syphilis may attack the brain in a variety of ways; that the pathological process may be slight and limited, or extensive and widely disseminated; and that the ultimate effects of the poison are imperfectly understood. Thus one of the more sharply defined clinical types of brain syphilis may, and frequently does, complicate another, thus creating a picture of considerable complexity; or symptoms of brain syphilis may be complicated by those referable to the spinal cord. On the other hand, the fact that the brain is invaded may be shown by one symptom only, viz., by a cranial-nerve palsy, by sensations of numbness and tingling, or by momentary aphasia or loss of power in a limb. Finally, certain chronic nuclear degenerations, such as ophthalmoplegia, or certain affections of the cortex, such as general paresis, while clinically related to syphilis, are yet to be proved to be certainly of syphilitic origin.

If these limitations are borne in mind, the following descriptions of clinical types will be found to cover most of the cases commonly met in practice.

**Basal Meningitis.**—The earliest symptom of this affection is headache.

It is always severe, becoming so intense at night that sleep is impossible or seriously interfered with. It is referred especially to the front, sides, and top of the head. It is paroxysmal in character. The mental state varies. In acute cases there is great restlessness and often active and noisy delirium, which may pass into coma. In chronic cases, which are more common, there is the characteristic sleepiness and inattention. Vomiting is sometimes present. Dizziness is frequent. General convulsions indicate a severe affection. Local twitchings or convulsions in muscles partly paralyzed sometimes occur. Fever is present sometimes in acute cases, though it is generally not high except in terminal stages. Extreme thirst is often complained of and polyuria is a frequent symptom. The urine may contain sugar. All these symptoms oscillate in their severity, and one or another is at times the more prominent.

The almost constant location of basilar meningitis in the middle fossa of the skull produces important symptoms referable to the cranial nerves, to the cerebral peduncles, and to the arteries making up the circle of Willis. The syphilitic process may affect the nerves by compressing them; more frequently it extends to the connective tissue of the nerve itself, thus setting up a neuritis. There is a great difference, however, as to the liability of individual nerves. The *olfactory* is rarely involved, although loss of its function, anosmia, usually bilateral, is sometimes observed. The *optic* nerve is frequently implicated. The ophthalmoscope shows an optic neuritis, usually bilateral, although generally more pronounced in one eye than the other. Or there may be a simple optic atrophy. Disturbances of vision dependent upon disease of the optic nerve occur in the form of hemianopsia, of concentric limitation of the visual fields, or of diminution in the acuity of central vision.

*Nerves of the Extrinsic Eye Muscles.*—Oculomotor palsies are the most constant localizing symptoms of basilar meningitis. They are, in the great majority of cases, unilateral. When occurring on both sides, the paralysis is more severe on one side than on the other. They cause double vision and are responsible to some extent for dizziness and uncertainty of gait. All have this in common, that they undergo fluctuations. They may appear suddenly and get very much worse or very much better in a short space of time. None can be regarded as incurable if improvement begins soon enough after its first appearance.

The *third nerve* is probably affected more frequently than any other by syphilis. The difference in the size of the pupils and the loss of pupillary reflexes, already mentioned, are due to lesions in its fibres or in its nuclei. In addition, palsies in the muscles which it supplies are very common. The nerve may be totally deprived of function, so that the external rectus and superior oblique are the only functionating muscles left. Under such circumstances there are ptosis, a marked external squint, and the pupil is dilated. The patient cannot turn his eye much farther

outward than it is held by the tonic contraction of the external rectus. More frequently there is paresis rather than paralysis in all the muscles supplied by the nerve, so that movements can be performed, though imperfectly; or one muscle may be much more profoundly affected than the others. Thus there is often a marked ptosis without serious affection of the muscles of the eyeball. Third-nerve paralysis is frequently ushered in by ptosis, the paralysis, if it extends, involving other muscles later. It often exists as the only cranial-nerve lesion.

Isolated paralysis of the *fourth nerve* (superior oblique) is very unusual, although it does occur. The *sixth nerve* (external rectus), on the other hand, suffers frequently, either alone or in combination with other nerves.

It is very rare for all the oculomotor nerves of the eye to be involved together. In such cases the lesion is usually chronic, acting on the nuclei rather than on the nerve trunks.

*Fifth Nerve.*—The trigeminus is among the more infrequent of cranial nerves stricken by syphilis. Paralysis of it occurs, however, either alone or in combination with other palsies; it is almost always limited to one side. The sensory symptoms are the most prominent. There is diminished sensibility or anæsthesia in the distribution of the nerve. This may result in ulceration of the cornea, through the lodgment of foreign bodies. There may be typical trigeminal neuralgia. Involvement of the motor root is much less common. It manifests itself by less power in the muscles of mastication on the affected side.

*Seventh Nerve.*—One-sided facial paralysis is a common symptom of basal syphilis. The nerve is usually affected after its exit from the pons, and the paralysis therefore has the characteristic of a peripheral paralysis. It is usually not complete and the electrical reactions show a diminution, rather than a loss of faradic excitability. The acoustic, the glosso-pharyngeal, the vagus, the accessorius, and the hypoglossus nerves are hardly ever affected by basal syphilis.

*Peduncular Symptoms.*—Associated with the cranial-nerve affections of basal meningitis there is frequently a loss of power in the limbs of one side, due to affection of one of the cerebral peduncles. This loss of power appears as a weakness rather than as a complete paralysis. The hand is clumsy, unwieldy, and weak rather than powerless; the leg is dragged and the patient limps, though he can still use the leg for getting about. This involvement of motion is usually of the spastic type, with increased tendon reflexes. It may be due to the pressure of small gummata upon one of the cerebral peduncles or the pons, or to arterial disease. Its arterial origin will be considered later.

The gummata are extensions of the meningitis along the pial septa which dip in between the nerve fibres and compress them.

As in this situation the motor tract is as yet uncrossed, peduncular or

pontine paralysis shows itself on the side opposite the lesion. But the cranial nerve injured by the same focus of disease has already made its exit from the brain axis, so that its paralysis is on the same side as the lesion. Consequently the clinical picture is that of *crossed hemiplegia* or paralysis of the limbs of one side, with paralysis of one or more cranial nerves on the opposite side. Such a disposition is the general rule. It has, however, occasional exceptions.

*Arterial Symptoms.*—The large arteries are frequently involved in basal meningitis. Arteritis in the vessels in the neighborhood of the meningitis develops simultaneously with the inflammation of the membranes, or else occurs as a direct extension of it. In other cases, a large artery at some distance from the meningeal focus becomes diseased. When the large arterial trunks are affected, the aspects of the case are much more serious, for the patient is then exposed to the danger of apoplectic symptoms. It will be more convenient to consider the symptoms under the description of primary arteritis. It is sufficient here to say that every patient with basal meningitis is exposed to arterial complications, and especially to thrombosis or aneurism of the basilar and middle cerebral arteries. These are accidents of the later periods of the disease.

*Course.*—Basal meningitis is as a rule a chronic affection. Sometimes the disease takes a rapid and stormy course, with intense headaches, vomiting, fever, convulsions, and rapidly appearing paralysis, ending in death perhaps in a few weeks. But such cases are unusual. Generally, one or two symptoms appear at a time, and go along with remissions and exacerbations, until recovery begins or until other symptoms are added as the patient gets worse. It may thus last for several months or a year. It may be terminated at any time, though generally not until it has existed for several months, by an apoplectic attack. Cases of long standing develop greater or less degrees of dementia.

## Primary Syphilitic Arteritis.

This term applies to the cases of cerebral syphilis in which arterial disease forms the first and most important lesion. It is extremely common. It may be widely distributed throughout the cerebral arteries, causing symptoms of general mental impairment. Its most conspicuous manifestations, however, result from the predominance of the affection, or a complication of it, in some large and important vessel, causing impairment or loss of one or more special brain functions. They result from a gradual closure due to obliterating endarteritis, or to a more sudden one, due to thrombosis. Thus there may be monoplegia or hemiplegia, numbness and tingling in limited areas or in a whole side of the body, muscular twitchings, epileptiform attacks, dizziness, all the varieties of aphasia, hemianopsia, etc.

The *symptoms* may be ushered in suddenly, without warning, the patient having considered himself in perfect health, or there may be a period of weeks or months of vague warnings, such as slight numbness down one side, or twitchings, or difficulty in speech, or weakness in an arm or leg, or attacks of dizziness; or, if the arterial disease complicates some pre-existing condition, it will have been preceded by symptoms of it. When the symptoms come suddenly, the picture is that of apoplexy. There may be an initial coma lasting usually not over a few hours, though the patient may die in it. Or, instead of coma, there may be drowsiness or a sudden violent pain in the head, or great dizziness, or simply a condition of mental confusion. Then follow the special localizing symptoms, such as paralysis (hemiplegia usually), local spasms, aphasia, etc. Sometimes coma, or mental symptoms, exist without any localizing signs. More frequent than these cases with apoplectiform development are those in which, during a period of headache and mental dulness lasting several weeks or more, there gradually appear special symptoms to indicate a partial closure of some important artery.

The *diagnosis* of syphilis of the cerebral arteries is of greatest importance, especially in the cases which come on gradually. It usually occurs in young adults. Probably, when heart diseases are eliminated, eighty per cent of all cases of apoplexy occurring under forty years of age are syphilitic in origin. The headache is distinguished from other headaches in being worse at night. It is severe, though less severe than that of basal meningitis. The individual symptoms are usually imperfect in their development. Thus the paralysis, though perhaps complete at first, usually improves very rapidly. In chronic cases there is paresis rather than paralysis. The symptoms may also be paroxysmal in character, worse and better on successive days.

The two affections—basal meningitis, with its frequent complication of arterial disease, and primary arteritis—are the most frequent and in general the most clearly defined clinical types of cerebral syphilis. They may perfectly well be complicated by syphilitic lesions elsewhere in the brain. Thus a basal meningitis may extend to the cortex, or may exist contemporaneously with a generalized or localized cortical meningitis. In some cases, however, isolated syphilitic lesions exist independently of either of the two commoner affections. Of these the most frequent are meningitis over the hemispheres and gummata.

### Cortical Meningitis.

This generally begins in the dura, extending to the pia, and then involving the subjacent brain substance. It may be either generalized or localized.

1. **General cortical meningitis and meningo-encephalitis** due to syph-

ilis presents itself under the clinical form of headaches, dizziness, of general impairment of the intelligence, often going on to dementia. Localizing signs, due to the meningitis itself, are not prominent. The condition is, however, generally complicated by disease in the cerebral blood-vessels, or it may take the form of pachymeningitis interna hæmorrhagica. Under such circumstances its naturally chronic course may be interrupted by successive apoplectic attacks.

2. **Localized cortical meningitis and meningo-encephalitis** are more acute than the preceding. They are frequently situated over the motor area and parietal lobes, and consequently such localizing symptoms as paralysis, Jacksonian epilepsy, aphasia, etc., are common. The headache is localized to, or at least more intense in, the affected area, and here also there is tenderness on percussion over the skull. Optic neuritis may be present, though this is not the rule.

The extent of the pathological process varies greatly, and consequently the general symptoms of brain disease, such as vomiting, dizziness, etc., are not the same in all cases. If the process remains localized and uncomplicated, the prognosis is relatively good.

**Gummata.**—Gummata of the brain may occur as extensions of local meningitis or may exist as isolated tumors in the hemispheres or the basal ganglia. They are rare in the cerebellum. They may be single or multiple, large or small. Their symptomology is that of brain tumors in general, with the special characteristics peculiar to brain syphilis.

**Syphilis and General Paresis.**—General paresis, either because it is now recognized more readily, or else by reason of the excessive strain modern times put upon the nervous system, has come to be a disease of frequency and importance, especially in large cities. Syphilis certainly plays an important part in its causation. While statistics vary as to the frequency with which the brain degeneration is preceded by the venereal disease, all agree that it is great. The clinical relationship of the two diseases, however, is not fully substantiated by post-mortem evidence, for the brain of a general paralytic does not present the histological anomalies most characteristic of syphilis; and the most expert pathologist, simply from the examination of such a brain, could not say whether the patient had had syphilis or not. On the other hand, the pathological changes found in general paresis have nothing to indicate that syphilis might not have caused them.

The most rational view is that syphilis is intimately concerned in the production of general paresis, probably through the agency of a late (parasyphilitic) toxin.

### Spinal Syphilis.

Syphilis attacking the spinal cord has many of the peculiarities already mentioned under brain syphilis. The symptoms vary from time to time

and are prone to relapse. Many of them are incomplete, in the early stages at least. Thus, the affection of motor power is apt to be in the form of paresis, rather than paralysis; one side is usually involved more than the other; sensory symptoms take the form of numbness and tingling and a slight blunting of cutaneous sensibility rather than of distinct objective anæsthesia. There is sometimes a dissociation of sensibility in spinal syphilis, *i.e.*, there may be loss of one variety of sensation with preservation of others. The most frequent variety of this is preservation of the sense of touch, with impairment or loss of the senses of temperature and pain. The loss of rectal control is rarely present early in the disease; retention of urine, on the other hand, may be pronounced from the first.

About one-quarter of the cases of spinal syphilis are complicated by brain symptoms. These latter may be slight and inconspicuous, being confined to headache, slight anomalies of the pupils, the paralysis of a single cranial nerve, or occasional accidents indicating interference with the cerebral circulation. On the other hand, both brain and cord symptoms may be prominent, constituting the type known as cerebrospinal syphilis. In this variety especially the spinal symptoms indicate multiple foci of disease. The special characters, association, and evolution of the symptoms of spinal syphilis vary with the type and situation of the lesion within the spinal canal. If the spinal-cord lesions are multiple and disseminated, the clinical type may be very complex. Syphilitic affections of the vertebræ, compressing the cord secondarily, are very rare. They cause a more sharply localized pain in the back and more pain on movement of the column than when the meninges or cord are involved primarily.

The most frequent form of spinal syphilis is meningomyelitis. Its symptoms vary with its location, but as its favorite seat is in the mid- and lower dorsal regions, the commonest type of spinal syphilis is spastic paraplegia, with pain in the middle of the back extending down the legs. The course of the disease is usually chronic; rarely is the onset sudden. It progresses for weeks or months with intervals of arrest or improvement. It may go on until the patient is totally paralyzed, with contractures, bed-sores, lost control of the sphincters—in short, to irremediable and sooner or later fatal loss of function of the spinal cord. When the disease is situated lower down in the cord, the type of paralysis is flaccid rather than spastic. When in the cervical region it may give a picture similar to the pachymeningitis cervicalis hypertrophica of Charcot. Then both arms and legs are affected. They are weak with increased tendon reflexes. Numbness and tingling are felt chiefly in the arms. Atrophy is often conspicuous in the small muscles of the hand. There are pain and stiffness in the neck.

One-sided lesions cause the Brown-Séquard type of paralysis, *i.e.*,

paralysis of motion on the side of the lesion, and disturbances of cutaneous sensibility on the other side.

In some few cases a gummatous deposit singles out some individual nerve root. This is especially frequent with the first dorsal. It results in pain in the neck, tingling, numbness or anæsthesia and pain in the inner side of the arm and hand, and weakness in the small muscles of the hand. As the cilio-spinal fibres from the sympathetic pass through this root, the most characteristic manifestation of its compression are a loss of the cilio-spinal reflex, myosis, and a sinking in of the eyeball, with narrowed palpebral fissure.

Finally, in some cases, ataxia is the most conspicuous symptom.

*Solitary gummata*, either of the dura or of the cord itself, give the ordinary focal symptoms of tumors of other characters in these parts.

**The Relation of Syphilis to Locomotor Ataxia.**—Syphilis stands in about the same relation to tabes as it does to general paresis. A large percentage of persons who develop tabes have had syphilis. Yet there is nothing in the pathological anatomy of the former disease particularly characteristic of syphilis. Neither are tabetic symptoms cured by specific treatment. Yet the great frequency of the association of the two diseases leaves little doubt as to a causal relation between them.

**Prognosis of Nervous Syphilis.**—When syphilis attacks the nervous system, two questions arise: First, What are the chances for recovery from the present attack? and second, What are the chances, in case of recovery, for future immunity?

The answer to the first question is, that if the symptoms are recognized early enough and vigorous treatment is instituted promptly, the chances are very good. Paralysis of the limbs or of the cranial nerves, coma, aphasia, optic neuritis, bladder disturbances—in short, any or all symptoms—may fade away if the cause of them has not induced irreparable injury to the essential elements of the nervous system.

If hemorrhage has occurred, or if local anæmia has gone on to softening, the prognosis becomes the same as for the conditions due to other causes. But when early danger signals, such as slight numbness, or thickness in speech, or headache, or twitchings, occurring in persons who have had syphilis, are recognized and acted upon, they usually disappear under treatment and are not, immediately at least, followed by others of more serious omen. Paralytic symptoms due to pressure of gummatous deposits may last for several weeks or even months, and then disappear entirely. When, however, such symptoms are the result of sudden arterial closure, and last so long a time, complete recovery is not probable.

The prognosis in all cases of syphilis of the nervous system should be guarded. It is best as long as the symptoms of arteritis are absent. But cerebral arteritis may exist without giving symptoms until its existence is made plain by thrombosis or hemorrhage, which may terminate the

case at any time. A certain number of patients do not respond to treatment, and in spite of all that may be done the disease goes on to cause permanent disability or death.

As to the probability of second attacks of syphilis of the nervous system, statistics are unreliable. It is a disease characterized by relapses, and there is a certain probability that a person who has been affected by it once may be affected again. There is no doubt, however, that many patients have one attack which is properly treated and they recover and never have another. The liability to subsequent attacks is diminished by a regular life and perhaps by occasional courses of iodide.

**Treatment.**—The treatment of the various symptoms of syphilis of the nervous system is to be carried out in accordance with the general principles of treatment of nervous disease. A word may be added here, however, in closing, on the special requirements of constitutional treatment.

This should be vigorous and should consist of inunctions, rather than of the internal administration of mercury, and large and increasing doses of the iodide of potassium. The inunctions should be carefully given every day for five days, then interrupted a day, on which the patient takes a warm full bath; then resumed for five days, and so continued for six weeks, stopping if the gums become touched actively. At the same time the iodide is being taken in increasing doses. Beginning with fifteen grains three times a day, the dose is rapidly increased until the patient is taking two hundred or three hundred grains daily.[1] Even larger doses seem successful in some cases, in which smaller doses have failed. Gowers maintains, and correctly we think, that if no beneficial effects of this mixed treatment are observable at the end of six weeks, the treatment is a failure and should be abandoned.

After an attack of nervous syphilis the patient may advantageously take two or three monthly courses of iodide (gr. xxx.–l. daily) every year for several years.

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[1] The senior author has given two ounces and six drachms each day for eleven days.

# CHAPTER XV.

## SYPHILIS OF THE GENITO-URINARY ORGANS IN BOTH SEXES.

### The Kidney.

Syphilis is found in the kidneys as interstitial, diffuse, connective-tissue-cell hyperplasia, as gummy tumor, and as amyloid degeneration.

The diffuse chronic syphilitic nephritis is similar to other forms of interstitial nephritis. It is more likely to occur in patches, and upon section small clusters and collections of cells are often found scattered through it. The patches of circumscribed disease become contracted and condensed with the progress of the affection, and the capsule adheres to them. They may undergo fatty degeneration in certain scattered areas.

Gummata are not often met with in the kidney. In structure they resemble gummata of other organs. They are always associated with more or less diffuse, parenchymatous nephritis, each gumma being situated in a condensed band of connective tissue.

*Amyloid degeneration* of the kidney has in it nothing that is specific. It may be associated with other lesions due to syphilis, or exist alone. In the latter case it is the rule to find the liver also and the spleen to be amyloid; but this degeneration may exist in all these organs, and yet the patient have no syphilis. Nevertheless, amyloid degeneration of the viscera is common enough in connection with late syphilitic cachexia to have attracted general attention; and although the change is not in itself specific, it is undoubtedly in some way often due to syphilis as a cause.

The only way in which the existence of syphilitic lesions of the kidneys can be even surmised during life is by the presence of albumin in the urine, with or without casts, for the ordinary tissue changes in the organ are not attended by local pain or general fever. There may be symptoms of uræmia (but very seldom) and general anasarca (equally rare), and often there are no symptoms at all, excepting the presence of albumin in the urine, to declare that the kidneys are not sound.

Many cases of albuminuria have been reported which have come on during the course of syphilis. They are generally unimportant, and get well under treatment. It is certain that in some cases slight transient albuminuria is produced by the prolonged use of iodide of potassium in large doses. This ceases on leaving off the drug.

Syphilis of the ureter does not seem to occur. Syphilis appears also to spare the bladder, except in connection with disease of the spinal cord.

### The Male Genitals.

The **penis** most often bears the brunt of the attack in primary syphilis in being the seat of chancre and lymphangitis. Later in secondary disease, cutaneous eruptions occur upon it, and mucous patches and ulcers within the cavity of the prepuce and (very rarely) within the urethra. Relapsing indurations occur early and late in the disease at the seat of the primary chancre. In tertiary disease, ulcerated subpreputial gumma is by no means rare; a papular eruption may occur within the urethra, giving rise to a gleet.

Finally, in tertiary disease, gummata occasionally occur in the corpora cavernosa, usually in the anterior third of the organ; they are very rare, and must be distinguished from chronic circumscribed inflammation of the sheaths of the corpora cavernosa[1] and from calcification of the penis.

Gumma of the corpus cavernosum is a hard, painless, semi-elastic swelling at first. It causes deflection of the penis when erect, toward the side upon which it is situated, and to an extent proportionate to the size of the growth. In structure it is like other gummata. It goes on to reach a certain size, and then may soften and shrivel away, or become fibrous, or possibly calcify. General calcification of the penis occurs in plates upon the sheath of the corpus cavernosum and is not syphilitic.

Chronic circumscribed inflammation of the corpora cavernosa is also mainly superficial, confined to the sheath and underlying tissue, somewhat painful to pressure, often advancing in one direction as it gets well in the other, never by any chance suppurating, occurring spontaneously or as a result of injury, never due to syphilis.

The last two affections are not in the least degree helped by antisyphilitic treatment, either mercurial or by the iodides; but gummy tumor promptly disappears when the latter remedy is boldly pushed in large doses.

The **prostate** does not appear to suffer directly from syphilis. Gumma in this region is possible, but very rare.

The **spermatic cord** is sometimes the seat of gummy tumor, and the **scrotum** a favorite locality for condylomata and scaly patches of the circinate sort.

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[1] Van Buren and Keyes: "Gen.-Urinary Diseases and Syphilis," New York, 1874.

## The Testicle.

**Epididymitis.**—During secondary syphilis, in the earlier months—three or four after chancre—there may appear in the epididymis, usually at its head, on one or both sides of the body, a round, hard tumor, standing distinct from the testicle, and not capped over it as in ordinary chronic epididymitis. It is attended by a slight amount of spontaneous pain, increased by manipulation; occasionally the swelling is perfectly indolent, and the pain is never so great as that experienced in ordinary epididymitis.

It is quite rare. It always gets well, never has been known to suppurate. It is quite constant in its appearance at the globus major, and does not extend to the body of the epididymis or to the globus minor. It never involves the testicle. Later in the disease the epididymis is attacked in its entirety, generally by a slow and indolent syphilitic process. In the tertiary stage the enlargement may be general or it may be nodular and irregular according to the distribution of the hyperplastic gummatous growth.

*Treatment* in the early stage is mercurial. In the advanced period iodide is indicated combined with mercury. Local measures are unnecessary.

**Orchitis.**—Syphilis of the body of the testicle in the late stages develops in a cellular overgrowth of connective-tissue elements constituting diffuse syphilitic orchitis, perhaps generalized through the whole organ, sometimes confined to a limited area.

Along with the other changes in the organ the tunica vaginalis becomes thickened, and its cavity obliterated by cohesion of its two surfaces, or cut up into partitions by partial adhesions. There may be a great or small amount of fluid in the tunic constituting a hydrocele, which may account for much of the swelling and must be removed before the actual contour of the testicle can be determined. Often a hard plate of overhanging tissue with a dense angular edge can be felt. This sign is nearly pathognomonic.

The result of the anatomical changes is a gradual, general enlargement of the organ or localized patches of induration, usually the former. After a time the organ atrophies and gets to be a mere fibrous knot, or, in any case, smaller than it originally was.

Syphilitic orchitis is a late symptom, rarely appearing during the first year of the disease, and sometimes coming on long after all symptoms have ceased. It is also found in inherited syphilis.

Gumma of the testicle is recognized as a distinct tumor perhaps accompanying the physical changes indicative of diffuse orchitis. It is painless. The nodule grows to a certain size, then softens centrally and

undergoes cheesy degeneration, or, infiltrating the tunica albuginea, the two surfaces of the tunica vaginalis adhere, and the skin becomes attached over the swelling mass, which opens and an abscess cavity is formed. In some instances the skin softens, ulcerates, and lets out the gumma with the contents of the testicle, constituting one form of benign fungus of the testicle.

The epididymis is sometimes the seat of gummy tumor, but rarely; and the cord (Verneuil) also occasionally.

The *symptoms* are an insidious swelling of one or both testicles without pain. Generally the patient finds out by accident that one of his testicles is unnaturally large and hard. Squeezing such a testicle in the hand causes the patient little or no pain, and the organ feels to the touch as hard as wood. It either preserves its oval shape when the epididymis is indistinguishable from the body of the testicle; or in some instances, when the epididymis is also involved, this portion may be felt as a crested overgrowth, when it has been appropriately called the "clam-shell" enlargement. The cord is not involved, the tunica vaginalis, instead of being obliterated, may be full of fluid.

The *diagnosis* of syphilitic testicle is often difficult. There is no possible danger of mistaking it for gonorrhœal epididymitis, or any other acute inflammatory affection of the epididymis or testicle; the intense pain in these maladies, both spontaneously and upon handling the organ, excludes syphilitic testis from diagnostic consideration when it is in question. Nor is there any considerable chance of the error of mistaking chronic epididymitis, the pseudo-tuberculous testis, for syphilitic disease of the organ. The lumpy condition of the epididymis capping the soft testicle above, or hanging down as a cheesy nodule below the tail of the epididymis, perhaps softening into abscess and becoming fistulous, but leaving the soft, elastic testicle intact in its peculiar natural sensibility, may occasionally suggest the syphilitic epididymitis, yet its chronic course and peculiar pathological physiognomy will readily distinguish it from the syphilitic affection.

The main difficulties in diagnosis of syphilitic testicle are hydrocele, tubercle, and malignant disease of the testicle. Hydrocele is not important. Many syphilitic testicles are so surrounded by the fluid of a hydrocele that their physical characters are entirely obscured. In no case is it safe to decide that a hydrocele is a simple matter until it has been tapped and the testicle examined. If, after tapping, the physical signs are those of syphilis of the testicle, no radical treatment of the effusion in the tunica vaginalis should be undertaken; both because it is likely to fail and because it is unnecessary, since antisyphilitic treatment will remove the effusion together with the lesion of the testicle.

Tuberculous testis, however, is often painless; and certain stages of cancer of the testicle and of sarcoma are suggestive of syphilis. The

salient points of clinical difference between these affections can be best presented in the form of a short diagnostic table.

DIAGNOSTIC TABLE.

| Syphilitic Testicle. | Tuberculous Testicle. | Neoplasm. |
|---|---|---|
| *Previous History.*—Syphilitic. | Tuberculous. | |
| *Commencement.*—Generally in the testicle. | Generally in the epididymis. | Always in the testicle. |
| *Growth.*—Insidious, often unnoticed, may last several years. | Slow; often lasts many years. | Sometimes slow; sometimes rapid. |
| *Size and Contour.*—Rarely larger than a goose egg; body of testicle hard and more or less smooth; epididymis free, sometimes presenting "clam-shell" induration; scrotum unchanged. | Often larger than a goose egg; nodular in the epididymis. | Sometimes enormous, weighing several pounds; sometimes lobulated; epididymis becomes involved; veins of scrotum often enlarged. |
| *Softening and Discharge.*—Rather exceptional; sometimes occurs, leaving fungus. | Softening and abscess the rule, leaving fistula. | Sometimes ulceration, leaving malignant fungus. |
| *Fluid in Tunica Vaginalis.*—Common. | Not unusual..... | Unusual. |
| *Pain and Tenderness.*—Absent. | Insignificant, as a rule. | Present as a rule, often very sharp; sometimes painless. |
| *Often bilateral*, simultaneous or consecutively. | Often bilateral consecutively. | Very rarely bilateral. |
| *Sexual Power.*—Diminished. | Sometimes diminished, often not impaired. | Not impaired, except by size and pain. |
| *Inguinal and Pelvic Glands.*—Normal. | Normal or tender from simple inflammation. | Involved. |
| *Spermatic Cord.*—Rarely implicated. | Generally involved..... | Often implicated toward the end. |
| *Seminal Vesicles.*—Normal.. | Frequently diseased ... | Normal. |
| *Treatment.*—Curative..... | Quite unsatisfactory; cure possible, but slow. | Ineffective. |

*Treatment.*—Syphilitic testicle in the diffuse form calls for mercury as well as for iodide of potassium. Local treatment is of little or no value, but a suspensory bandage should be used to protect the enlarged organs from injury. The effect of treatment is slow, but should be persisted in to save as much of the glandular structure as possible from atrophy. The iodide should be pushed up to large doses to the point of full tolerance and the effect watched.

For gummy tumor, the iodides alone are needed, in doses as large as the stomach can conveniently manage. A prompt effect is to be expected.

## THE FEMALE PELVIC ORGANS.

The female genitals are the common seat of chancre, erosions, and mucous patches. Tertiary tubercular patches are found within the *vagina*, and tertiary brawny infiltrations leading to ulcers which are very chronic

in their course. Gummata in this region, which are rare, may perforate one or the other of the vaginal septa. Lancereaux describes a case of gummy tumor of the *ovary* similar to the same lesion in the testicle, and both he and Hutchinson have encountered some cases of imperfect sexual development in the female, in connection with congenital syphilis, making it seem probable that parenchymatous ovaritis is possible in hereditary syphilis, as parenchymatous orchitis and gumma of the testicle in the male are known to be.

Gummata have been found in the *Fallopian tubes.*

Functional derangements of menstruation are very common in women with syphilis. In the secondary stage, anæmia leads to scanty menstruation, the relaxed ligaments allow the organ to become easily displaced. Hence arise all sorts of malpositions with catarrhal states of the uterine cavity, dysmenorrhœa, metrorrhagia, sterility, hysteria, etc.

The cachectic stage of tertiary syphilis also leads to uterine derangements which induce premature change of life.

A chronic hyperplastic infiltration of the cervix is known to occur as a result of syphilis, which leads to a fibroid induration and stenosis of the os.

*Treatment* of these uterine derangements is that of the stage of syphilis in which they occur, together with such local measures as each individual case may call for. Certain uterine growths have disappeared under the treatment with iodide of potassium and mercury, but nothing very definite is known of syphilis of the uterus.

# CHAPTER XVI.

## SYPHILIS OF THE EYE AND EAR.

THE skin of the **eyelids** is occasionally the seat of chancre; patches of various kinds of eruption may come upon it, mucous, flat papules are not uncommon, and circumscribed gummata are often found in this region.

The **tarsal cartilages** may be attacked by syphilitic inflammation during the course of the disease, producing considerable infiltration of the lid and lasting for weeks and months.

Upon the **conjunctiva**, chancre and mucous patches have been observed.

The **lachrymal gland** may become enlarged and indurated as a result of syphilis, but this condition is a rare one. The *caruncles* are the seat both of chancrous ulcerations and gummy tumors.

The **lachrymal sac**, and the skin over it, may be the seat of gummatous deposit, and if this be allowed to ulcerate, lachrymal fistula may result. The **nasal duct** is frequently occluded by reason of ulcerative gummatous changes within the nasal cavity, especially if the lachrymal bone be involved in necrosis.

**Changes in the cornea** are uncommon in acquired syphilis. With inherited disease chronic interstitial keratitis is quite common. It will be described along with the other lesions of inherited syphilis. *Chronic diffuse interstitial keratitis* due to acquired syphilis in the adult does occasionally occur, the entire cornea being thickened and obscured, due to interstitial cellular infiltration. Another form known as punctate keratitis occurs as scattered areas of corneal opacity.

**The sclera** is also sometimes the seat of syphilitic inflammation and gummatous deposit. Two forms are spoken of, according as the superficial or deep structures are involved, viz., *episcleritis* and *parenchymatous scleritis*.

The *treatment* of these affections consists mainly in the use of antisyphilitic remedies, the protection of the eye with smoked glasses, and general tonics.

In keratitis atropine instillations are also indicated.

The **iris** suffers very often in acquired syphilis.

It is probable that at least half of all the cases of *iritis* which occur are syphilitic in origin. Iritis most often comes on in severe cases of syphilis with one of the early eruptions; particularly is it apt to coincide with a pustular eruption. The symptoms are exactly the same as those

of acute iritis due to any cause; slight dulness and change in the color of the iris, more or less injection of the pericorneal conjunctiva (possibly chemosis), lachrymation, supra-orbital pain, generally worse at night, and intense photophobia. The pupil is hazy, and will not dilate in the dark. When forced to dilate by the use of atropine or duboisine, its margin is often festooned, it does not dilate regularly. Plastic exudation of lymph, effused from the borders and posterior surface of the iris, is quite common, by means of which adhesions are effected with the anterior capsule of the lens, and the dilatability of the pupil is permanently compromised. Its opening may be entirely occluded. A thin, diffused seroplastic exudation sometimes fills the anterior chamber (serous iritis). It may be seen to be absorbed and to melt away under treatment.

The simplest form of iritis occurring early in the disease is spoken of as *plastic iritis.* Where the affection is more deeply seated and is accompanied by cellular infiltration it is known as *parenchymatous iritis.* In this form suppuration may occur which often appears in scattered nodules or tubercles upon the surface of the iris.

*Gumma of the iris* is less common, but may be observed as a small, yellowish-red papule growing from the iris. This may reach a considerable size, fill up the pupil, and distend the anterior chamber. It may disappear under the internal use of the iodide of potassium. Instead of growing out as one distinct tumor, there may be several small gummata upon the iris, or the whole muscle may be diffusely infiltrated and contract strong adhesions with the capsule of the lens.

The *ciliary body* and the *choroid* may be involved in inflammatory and gummatous complications in connection with syphilitic iritis.

Relapse of plastic iritis, especially if there be many adhesions, is quite common, and these relapses may continue on for a number of years. Plastic iritis is often double, simultaneously or consecutively. Gummatous iritis is generally confined to one side.

*Treatment.*—Iritis when seen early generally yields a prompt obedience to the influence of mercury or the mixed treatment, according to the stage of the disease in which iritis appears. If the patient is anæmic and debilitated, cod-liver oil, tonics, change of air, good food, etc., are all of the highest value. The mercury should be pushed until the gums show its influence slightly.

The great danger in iritis is adhesion of the pupillary margin to the anterior capsule of the lens. If this occurs, it is vastly better that it should do so with the pupil widely dilated; hence it is always advisable to use instillations of solutions of atropine into the eye. A solution of gr. i.–iv. to the ℥ i. of distilled water may be used; a few drops being placed beneath the lid once a day, or oftener, if it is found necessary, in order to hold the pupil dilated to its greatest extent, and this should be continued until all photophobia has passed and all conges-

tion ceased. The eye should be kept closely shaded from light, but it is not wise to keep the patient in the house, much less to confine him to a dark room. In case of great pain hot compresses and sometimes leeches over the temple are employed.

The gummatous form of iritis comes most readily under the influence of the iodides, but the use of atropine is desirable in these cases as well as in the other forms. For old cases when the pupil is adherent, and relapses occur, iridectomy is the remedy.

Syphilis of the ciliary body or *cyclitis* is generally observed in connection with inflammation of the iris (iridocyclitis) or of the choroid. Gummata have been known to occur in this region.

The **choroid** may be affected by syphilis alone, or in connection with disease in other structures within the globe; it often participates in inflammatory disturbances which primarily involve the iris. *Choroiditis disseminata*, or *plastic choroiditis*, is a common form of the disease as produced by syphilis. In this condition the ophthalmoscope reveals, through a clouded vitreous humor, small scattered spots of a pale color, perhaps with reddened borders, distributed over the posterior surface of the chamber of the eye. The retinal vessels may be occasionally seen unchanged, passing over these spots, which are of varied size, and are evidently elevated exudations. The optic nerve is congested.

These elevated exudations may disappear entirely under treatment, leaving but little trace, or they may be succeeded by small white atrophic spots without pigment, except at their borders, where there is an intensification of pigmentation in the shape of a dark line. The vitreous is more or less clouded with opacities. There is also a serous choroiditis resembling serous iritis in which the exudation is serous instead of plastic. A condition involving a marked increase in the cellular tissue, also seen in iritis, is likewise termed *parenchymatous choroiditis*.

This affection is chronic in character. The amount of influence upon vision is proportionate to the position and extent of the exudative patches, and the degree of atrophy following them. The course of the malady is very chronic; it occurs in late secondary disease, and well along in the tertiary period. Mercurial treatment is appropriate, and, unquestionably, is often slowly productive of much good. In old cases, in which atrophy is an accomplished fact or far advanced, treatment is of little or no value. Local treatment is useless. The eyes should be kept protected from strong light.

The **retina** also suffers from syphilis. Both eyes may be attacked simultaneously or successively. There is no outside redness upon the conjunctiva, no lachrymation, no pain, moderate photophobia. The only subjective symptoms are, in the beginning, flashes of light; later, failure of sight. The affection may get well and leave little or no trace, or may lead to permanent impairment of vision.

The ophthalmoscope reveals a cloudy vitreous and a retina apparently obscured. Its outlines are less distinct than usual, the retina is œdematous, the retinal vessels, as well as the optic nerve, are hyperæmic; the outline of the papilla is not clearly marked. The veins are full, and there may be hemorrhages.

*Retinitis* occurs more commonly in combination with choroiditis when it is characterized by infiltration of the vitreous. In the forms in which the inflammation is distinctly confined to the retina itself there is general opacity of this structure with more or less hyperæmia, œdema, and ecchymosis according to the intensity of the inflammation. The finer distinctions between the other forms of retinitis are too technical to come within the scope of this work.

The *treatment* of syphilitic retinitis is by mercurials in moderate amount. No great energy of treatment is called for, and a cure may be expected if treatment is applied during the early stages of the malady. The eyes should be shaded by colored glasses. The abstraction of blood, by occasional leeching of the temple, has been recommended.

**Optic neuritis** is an affection very common in syphilis in connection with a variety of lesions of the brain. It may also originate primarily within the globe of the eye independently of external causes. It is very often found in connection with convulsive and paralytic changes due to syphilis, and is looked upon as a corroborative symptom of great value in many cases.

The symptoms are: diminution of the field of vision, in one direction or another, often irregularly—a portion, perhaps an irregular half or a quarter of the field, being lost. A routine examination of the eyes with the ophthalmoscope should be made in all cases of nervous disease due to syphilis, especially if there be pain in the head, in order that impending optic neuritis may be detected early and loss of sight warded off.

In simple, light cases of optic neuritis, the ophthalmoscope shows only a little indistinct blurring of the papilla, a congestion of the nerve, and distention of the central vessels. In severer cases, the disc is greatly swollen, with irregular, obscured borders. The disc seems infiltrated, and is of a cloudy white or grayish-red color, the vessels are distended, irregular, tortuous. This appearance is known as "choked disc." It indicates intracranial pressure, as by a tumor, and is a syphilitic symptom only by coincidence. It occurs equally well in connection with tumors of the brain due to other causes. Optic neuritis is oftener double than single.

The *treatment* of optic neuritis is the mixed treatment of tertiary syphilis with preponderance of the iodides. Local measures are unnecessary. The effect of treatment often depends upon the promptness with which it is commenced and its power to remove the intracranial lesion, which has given rise to the trouble in the eye. The eye symptoms are

often of only secondary importance; but improvement in the size of the field of vision and an arrest in the progress of the affection may be frequently attained by suitable treatment persisted in for a considerable time.

### Syphilis of the Ear.

The **external ear** is the seat of many cutaneous lesions and ulcers in syphilis; mucous patches appear sometimes in the external auditory canal, and a peculiar dry scaliness of this canal, with tendency to impaction of cerumen, is quite commonly encountered in syphilitic patients. This affection calls for constant care and frequent syringing of the ear to keep the passage in good order and the drum-head clear until the tendency to dry exfoliation passes away. Improving health, when the depressing influence of syphilis has been removed, restores the integument of the auditory canal to its normal condition. Gummata of the external ear are rare.

The **middle ear** suffers in various ways by syphilis. Ulcerative and bony lesions within the cavity of the nose and the pharynx lead to thickening and inflammatory changes in the Eustachian tube and its mucous lining. These may terminate in catarrhal troubles of the middle ear and consequent impairment of hearing.

Inflammation in the middle ear generally extends from syphilitic trouble in the nose or throat. It may assume a catarrhal type and lead to sclerosis or suppuration, periostitis, or rarefying ostitis of the bony structures.

The **labyrinth** is sometimes involved, but more commonly in inherited than acquired syphilis.

The *symptoms* of middle-ear disease are mainly tinnitus aurium and impairment of hearing in various degrees. There may be no pain and the hearing may not be seriously affected until the disease has existed for a long time. Ulcerations in the nasopharynx accompanied by impairment in hearing should lead to the suspicion of catarrhal inflammation of the middle ear.

The *treatment* consists in the employment of warm syringing, the application of leeches behind the ear, and inflation of the tympanic cavity. The mercurials internally are generally more effective than the iodides; but the possibility of implication of bone calls for the use of the last-mentioned remedy, although not in very large doses.

The **auditory nerve**, the second branch of the seventh pair, is sometimes the seat of special disease in syphilis, aside from any loss of function due to disease of the bones of the internal ear or gummy tumor involving the nerve. Such essential loss of function in the nerve has been observed in the secondary stage and is greatly improved by internal treatment. In tertiary disease it sometimes comes on suddenly without

warning, not attended by pain, without any especial symptoms except that the patient becomes deaf—often very rapidly so.

If the *cochlea* is involved, the high notes of the musical scale are lost first (Roosa), or are heard double, and the tuning-fork on the forehead is heard best in the sound ear. Some ringing of the ear is complained of, and vertigo, with staggering, are apt to usher in the disease.

The *diagnosis* of syphilis, in cases of deafness coming on in this way, must be based upon the history and concomitant symptoms.

The *treatment* must be energetic. No time is to be lost. The disease should be taken, if possible, at its very beginning, and opposed vigorously with specific remedies from the start. Both mercury and the iodide of potassium should be used, and both should be pushed rapidly to the point of tolerance. If possible, the mercurial bath should be employed. Everything in these cases must be made subservient to the treatment. The patient should be confined to an unirritating diet, give up business, and have his mind at rest.

# CHAPTER XVII.

## INHERITED SYPHILIS.

**Syphilis and Pregnancy.**—Syphilis may be transmitted by inheritance. The question of its transmission to the child from either one or both parents as well as the possibility of inheritance in the third generation has already been discussed (page 206). There can be no possible doubt that active early syphilis in the mother necessitates disease in the child, if the latter comes to term at all; while active early syphilis in the father is not incompatible with a healthy child, if the mother be not poisoned. After syphilis becomes latent in the parents, when they both appear to be healthy, the child may still be syphilitic, and repeated successive conceptions may all yield a diseased product for a number of years, the limit of which cannot be definitely stated. This much, however, seems certain, that the rule is for syphilis eventually to wear itself out, and for syphilitic parents eventually to produce healthy offspring, provided their own health has not been seriously and permanently undermined by syphilitic cachexia or visceral lesions. In other words, syphilis is transmitted only as syphilis. A syphilitic parent may produce a weakly child, because she has had her own health broken by syphilis; but she would have produced exactly the same child had her health been broken by want and privation, by cancer, by malaria, by alcohol, or any other cause. Syphilis does not change in type by transmission. It does vary greatly, as seen in the child, but it varies in activity, in intensity, not in type. A child born to parents in active syphilis will probably die, unless its own vitality has been sheltered by the treatment of the mother while it was in the fœtal state. A child born to parents whose disease is on the wane, perhaps nearly exhausted, shows but few evidences of disease, and those perhaps only during adolescence; but what symptoms it does show bear the brand of syphilis, and are relievable, if at all, mainly by antisyphilitic treatment.

Statistics seem to show that about one-third of the total number of children conceived by syphilitic parents die in utero, and of those which are not still-born about twenty-five per cent succumb to the disease during the first few months.

*Syphilitic Abortion.*—When a woman is in active syphilis, she rarely carries a child to term. At first it is customary for such a woman to abort at or about the third month of utero-gestation. Such a woman may

have been poisoned by her husband, and had a chancre without knowing it.

Should she become pregnant again, she will again abort, but probably at a later month of utero-gestation. Again pregnant, she again aborts; on this occasion, perhaps, miscarrying at the seventh month. The next attempt may produce a dead-born child, with its skin commencing to come off. Finally a child will be born at term alive, perhaps plump and clean-skinned, but in from two to four weeks it begins to fall away in flesh, gets snuffles, sore mouth, eruptions, jaundice, and dies; another child appears and dies in a convulsion after a few months of life, or perishes by marasmus in its second summer. At last a fat child is born seemingly healthy, but, as it grows, its fontanelles close too rapidly, it is microcephalic, looks like an old man, is perhaps very precocious, but it has a harsh cry, contracted jaws, bad teeth; the second set are syphilitic teeth. It has a syphilitic countenance, and grows up, perhaps, dwarfed or deformed in its bones, to fall a victim, possibly, to gummatous lesions of the bones, the brain, the eye, or the viscera during development into manhood.

After this the mother will produce a perfectly healthy child, if her own health be good. Her subsequent offspring will not probably be deformed. A child may be weakly, if the mother or father, or both, be in poor health, or from a variety of causes; but if the parent is syphilitic, the child is either syphilitic or healthy, so far as the syphilis essentially has anything to do with the matter.

Now, during all this time above detailed, a mercurial treatment given to the mother, by inunction or internally, during the whole course or the greater part of her pregnancy, will generally cause her to produce a healthy child—a child who not only is healthy at birth, but remains healthy, and does not require treatment. Treatment rarely has so good an effect if used in the first pregnancy. Then the syphilitic poison is too strong. A live child may be born reasonably healthy, but its health is not assured, and it may demand treatment to preserve it from injury by the development of hereditary syphilis.

Again, if a mother has produced a healthy child under treatment, she must go on, and at her next pregnancy again take a full mercurial course, although she may have had no symptoms of syphilis during a number of years, or she will run the risk of again producing a diseased child. During how many pregnancies this must be kept up is not known, but cases are on record in which the successful production, under mercury, of two healthy children successively (the eighth and ninth, all the previous children having died syphilitic) did not succeed in rendering the mother capable of bringing a non-syphilitic child into the world. In cases of this sort, therefore, it will be wiser to medicate the mother at least through three successive pregnancies before allowing her to try the experiment of passing through a term of utero-gestation unaided by drugs.

The cause of abortion when the mother is syphilitic is believed to be toxins which are generated in her system and circulated through her blood and which possess varying degrees of virulence according to the stage of the diesase and the effect of treatment.

When the intensity of syphilis is great enough, the germ is incapable of development to maturity, and the fœtus dies. This death of the product of conception is probably attended by and due to alterations in the placenta which destroy any resistance this organ may exercise against the entrance of the syphilitic toxins into the fœtal circulation. The ovum may be blasted to such an extent that abortion of a misshapen organized mass occurs within a few months after conception. The syphilis of the parents, under these circumstances, is too apparent to need confirmation by any fresh proof drawn from any condition of the ovum. Attempts at saving the fœtus must be made at each subsequent pregnancy, and the chances of success will improve very materially with each attempt.

When the child has been fully formed, and then dies in utero, it is very uncommon for the uterus to carry it to full term. Abortion usually occurs about the sixth month or sooner, unless inoculation of the mother takes place after impregnation, when it occurs somewhat later.

The condition of affairs described above may certainly be averted by *treatment*. Mercurial treatment is of the most value. The iodides have little or no power in averting the tendency of syphilitic women to miscarry. Mercury will generally do this, and when it accomplishes the result, it does so without injury either to the child or to the mother.

The manner of giving mercury, under these circumstances, is unimportant, provided enough be given. Inunction is highly praised by some authorities.

The blue mass, which is an unirritating form of mercury, is appropriately combined with a tonic in one of the following:

℞ Pil. hydrargyri, . . . . . gr. c.
Ferri sulph. exsiccat., . . . . . gr. l.
M. ft. pil. l.

Or—

℞ Pil. hydrarg., . . . . . gr. c.
Quinin. bisulph., . . . . . gr. l.
M. ft. pil. l.

Commencing at the beginning of pregnancy, one of these pills is to be used after each meal (three a day) for a week. Then four pills a day are used for a week, then five pills a day for a week, and so on until the medicine begins to disagree. When the mouth becomes a little touched, all medication is suspended for a week, and then a dose, two-thirds of what was found necessary to touch the mouth, is commenced with and given regularly. It may be alternated, from time to time, with a mild dose of

corrosive sublimate in compound tincture of bark. It may be intermitted entirely for a time, and replaced by inunction if the stomach becomes irritated.

Such a course will save most mothers from miscarrying. The chances of averting the mishap are greater the farther removed the conception is from the chancre. Success or failure in one pregnancy must modify the treatment of the next, and the result is certain to be finally satisfactory to all concerned.

Milk diet, combined with the mercurial, is very advantageous in pregnancy, and in any case a mild diuretic should be occasionally used.

## Symptomatology of Inherited Syphilis.

When a fœtus has been dead in the uterus for some time it becomes macerated. The epidermis rises into large bullæ over portions of the body, or sheds off entirely in large patches. The amniotic liquid is more or less cloudy, discolored, sometimes putrid. In such children are found invariably certain pathological tissue changes in the viscera and in the bones, particularly the epiphyseal ends of the long bones. These changes are the same as those which are found (although less marked) in the viscera and bones in children who die of inherited syphilis at varying periods after birth. The visceral changes are much the same as those which occur in connection with some cases of acquired syphilis, the difference being that, with inherited disease, visceral lesions are more common than in acquired syphilis, and that they are more often of the diffuse interstitial type than gummatous, as distinct tumors. Interstitial hyperplastic thickening of the stroma of the liver and lungs is very common in inherited syphilis—so common as to be the rule in all cases dying early. The thymus is quite constantly involved, and the spleen and kidneys are very often implicated. The ordinary necrotic and carious changes, the subperiosteal gummata, and the ulcers involving the bone, already described for acquired syphilis, occur also sometimes in children with inherited disease who survive; but the lesions now about to be studied are found only in inherited syphilis, and are peculiar to it. They are very constant also, and it is said may always be found upon any dead-born fœtus if the cause of its death has been syphilis.

**The Bones and Joints.**—The symptoms of bone syphilis in inherited disease are a thickening at the ends of the long bones, sometimes involving the skin in inflammatory adhesion, sometimes attended by local softening and suppuration, sometimes having gone on to a separation of the epiphysis from the shaft of the bone, and given rise to an inability to use the limb (pseudo-paralysis—Parrot[1]). The bones most often diseased

[1] Archiv. de physiol. norm. et path., 1872, Nos. 3, 41 and 5.

are the long bones of the extremities, the ribs, the clavicles, the metacarpal and metatarsal bones. The lesions are nearly always symmetrical.

All children with inherited syphilis do not necessarily suffer with these bony changes, or at least, if they do, they grow up without bearing any evidence in their bones that they have so suffered; but, if the syphilis in the inherited state be intense enough to blight the ovum and cause the death of the fœtus, then these bony changes, more or less marked, are constantly found.

The changes in the bones take place at the line of cartilaginous junction between different centres of ossification, and are most marked at the epiphyseal line of junction at the ends of the shafts of the long bones (osteochondritis). Here may be found fusiform swellings, thickening of the bones, and osteophytes, bony overgrowths, which may be felt through the skin. If the degenerative changes have advanced far enough, an epiphysis may be separated from its diaphysis without any preforation of the skin or discharge of necrotic material; or the skin may become adherent and perforated, allowing the débris of bony and cartilaginous tissue, which much resembles gummatous material, to be discharged externally.

All of these conditions (except the last) may be found in children dead-born, and, any of them, during infantile life, with or without other evidences or of syphilitic disease. They should be sought for in the fœtus dead-born and prematurely delivered, if there be any reason to suspect syphilis in the parents.

Another morbid condition, due to syphilis and described by Parrot,[1] is the formation of osteophytes in the anterior fontanelle of the growing child, by means of which the sutures sometimes become ossified and the development of the cranium and of the brain interfered with, or even arrested.

These syphilitic changes in the ends of the long bones may require the microscope for their detection. Often, however, the changes are manifest to the unaided eye. The thickening at the end of the bone may be felt and seen. The perforation of the skin and gummatous discharge can be seen and touched. The loss of function is obvious.

It is possible to divide the minute changes into three degrees:

In the first degree a layer of osteophytic growth may envelop the bone, sometimes making it so thick as to double its diameter. The epiphyseal cartilage is also thickened. The cartilage cells become hypertrophied. Increased proliferation takes place within them, and the cartilage becomes prematurely infiltrated with earthy salts.

In the second degree there is premature calcification of the intercellular substance and arrest of true bony formation.

In the third degree there is softening, and inflammatory changes take place.

The exact histological nature of the morbid process does not seem to

[1] *Ibid.*

be invariably the same, although the changes always take place in a line between the proliferating and the hypertrophic zone of the cartilage, as shown by Haab.[1]

Wegner[2] looks upon the process as an osteochondritis beginning in the cartilage. He believes that the vascular supply through the vessels becomes deficient, through a too rapid deposit of bone salts on the one hand, while the proliferating cartilage cells, on the other hand, make a stagnating zone between the proliferating cartilage and the medullary spaces of the diaphysis.

Others have pronounced the process to be the formation of a syphilitic granulation tissue, growing out from the medullary prolongations of the diaphysis into the cartilage, and there falling into softening which leads to a shedding of the epiphysis.

The pathognomonic value of these changes in the ends of the long bones is very great, since no one has yet claimed to have found them produced by a cause other than syphilis, and they may therefore be largely instructive as to the cause of death in obscure cases, in which repeated miscarriages take place, and the existence of syphilis in the parents is not on any other account suspected.

*Periostitis* also attacks the bones of syphilitic children, notably the long bones, and is a later manifestation than the previously described condition, generally occurring after the child walks about.

Syphilitic lesions of the **joints** assume the same type as in the acquired form.

Syphilitic *dactylitis* occurs in the early period of hereditary syphilis, involving swelling of the phalanges and metacarpal bones, sometimes invading the joints. The characters of these lesions resemble those of acquired syphilis, under which heading they are described.

The *treatment* of syphilitic children upon whom these lesions exist is very effective. It should be a mixed treatment, mercury being used by inunction, and the iodide of potassium given internally in repeated doses well diluted, commencing with a very small dose (half a grain or less for an infant) and increasing it steadily but slowly, as it is tolerated, until a dose producing an obvious effect is reached. A dose somewhat smaller than this maximum dose may be continued for some months after the child has recovered from all local evidences of progressive disease.

The **visceral lesions** of hereditary syphilis are generally more severe than in the acquired disease.

A child born alive with inherited syphilis[3] may have its lungs so

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[1] Virchow's Archiv, vol. lxv. [2] *Ibid.*, vol. l.

[3] Acquired syphilis (for example, vaccinal syphilis) is very serious, and often rapidly fatal in the infant; but it is similar to acquired syphilis in the adult, in that the visceral lesions only come on after a longer or shorter period of secondary eruptions.

stiffened with interstitial, syphilitic, cellular changes that it cannot breathe sufficiently to support life. Its liver may be solid with parenchymatous changes, and it may grow visibly yellow and expire in a few days or weeks, without any especial symptoms on the skin or mucous membranes.

On opening the abdomen of a child dead with inherited syphilis, an enormous liver is often found, which has undergone infiltrating changes at the expense of the normal glandular structure. It is hard, tense, elastic. A piece of it, cut out, slips away when pinched between the thumb and finger. It may be so dense that the finger can bore a hole in it only with difficulty. Collapsed and thickened vessels show on the pinkish-brown surface of section as white knots, from which radiate thin whitish streaks. The organ is the seat of diffuse interstitial hepatitis.

In inherited disease, the spleen may be larger and harder than usual, but gummata are rarely found in it. Eisenschutz[1] thinks that enlargement of the spleen, easily detected by palpation, is a diagnostic symptom of latent inherited syphilis.

Digestion may be interfered with by the induration of the pancreas, which Birch-Hirschfeld[2] found to be so common in his autopsies of children dead with inherited syphilis. Occasionally a child dies in convulsions without any surface signs of syphilis.

Ordinarily, however, when a syphilitic child is born alive, even if it happens to be plump and fresh-looking for the first few days, very characteristic changes soon begin to show themselves. The face grows thin and old-looking. If there have been any eruptive phenomena at birth (excoriated, papular, scaly patches), these increase in number and extent. If the skin was intact at birth, it begins to show livid patches, which run on to become papular or pustular; or excoriations of livid color, and cracks and fissures appear, with pimples, boils, abscesses, and other lesions. Condylomata and ulcers at the anus are very common. The skin comes off from the fingers and is shed from the palms and soles in large patches; sometimes the nails come off. Mucous patches, fissures, and ulcers appear about the mouth. In fact, the child with hereditary syphilis is subject to all the lesions of the skin and mucous membrane which appear in the acquired form (Fig. 105). They are liable to be more diffuse and more severe. Catarrh involves the nostrils and the child gets the snuffles, the nostril caking up to the point of complete obstruction, so that the child finds it difficult or impossible to nurse.

Meantime the voice grows husky, hoarse. The child cries in a frightened, explosive way, or moans its life out in croaking sobs. Dry, tearless, pitiful crying is sometimes the method the poor little sufferer takes

[1] "Das latente Stadium der hereditären Syphilis," Wien. med. Wochenschrift, 48, 49, 1873.

[2] Archiv f. Heilkunde, February, 1875.

to announce his distress; but he soon becomes marasmic, and death cures him of his pains.

If by careful nursing and active treatment he pulls through, he may

FIG. 105.—Inherited Syphilis. Polymorphous eruption. (After Kaposi, Morrow.)

become marasmic later, or be stunted in his growth, perhaps weakly in constitution, possibly hydrocephalic. During his early life he may have disease in his bones, ulcers, gummata in different positions, ocular trou-

bles; indeed, he is exposed to a long series of disorders, which, if not controlled by antisyphilitic treatment, make life a burden and lead to destruction of tissue, to deformity, to loss of function in various important organs.

On the other hand, a child may entirely recover, and, after a reasonably prolonged treatment, grow up to good health and become as vigorous as any one. Such children, nevertheless, may have syphilitic teeth and be stamped with the syphilitic countenance for life.

The date of appearance of syphilitic symptoms upon children with inherited disease, who are born apparently in perfect health (as often happens), is very variable. Statistics taken in lying-in hospitals make the most common period about the second three weeks of life. Occasionally children grow up to be several months old before symptoms show themselves, and these symptoms may be quite light and be overlooked. Fournier has a case in which inherited syphilis appeared at the age of twenty-five; Zambaco has one at twenty-six; Bulkley one at twenty-three, and another at twenty-four; Dron one at twenty.

This possibility of the appearance of lesions due to hereditary syphilis late in life must be constantly kept in mind, or mistakes are quite certain to be made, to the grave detriment of the patient.

The following are important external manifestations of hereditary syphilis:

**Syphilitic Pemphigus.**—Flattened bullæ, varying in size from that of a small split-pea to that of a penny, situated upon a red base with a red areola and containing a thin sero-pus, are sometimes found scattered over the surface of syphilitic children at their birth, or coming out in crops shortly after birth. This is the pemphigus of the new-born; it is nearly always syphilitic in nature. It is said of the infantile pemphigus not syphilitic that it always first attacks other parts of the body, appearing later upon the palms and soles, while true syphilitic pemphigus starts always in the last-mentioned localities, and may indeed remain confined to them. The bullæ burst and show excoriated, livid surfaces beneath, or dry up into greenish-yellow crusts.

Children so intensely syphilitic as to have this eruption very rarely recover under any treatment. Mercury by inunction is most suitable.

**The Syphilitic Countenance.**—Certain physical traits of countenance, marked more or less strongly in different cases, are commonly enough encountered, upon growing children with inherited syphilis, to be considered pathognomonic of the disease. They constitute what Mr. Hutchinson calls the syphilitic countenance, and are striking enough to attract attention and to put an observant physician upon the track of syphilis in many cases before he has asked the patient a single question. A child with inherited syphilis does not necessarily have the syphilitic countenance. Many children, unmistakably syphilitic by inheritance, bear no

marks that distinguish them from healthy children. One child in a family may be marked, and all born later may escape.

In a child somewhat stunted in growth, perhaps looking pinched in all its physical contour, or squared and dwarfed in stature, generally with an abnormal intelligence running to precocity which delights its parents, or to a stolid stupidity suggestive of idiocy—such a patient, a growing boy or girl, without any positive ulcers, or nodes, or other lesions indicative of syphilis, will be found often to have a coarse skin, with the pores more marked than usual. His color will not be ruddy, but sallow, dead-looking, dry, or perhaps greasy. His face will look flattened out, rather devoid of expression, prematurely old, grave, perhaps anxious. His forehead is rounded and prominent, like that of a hydrocephalic child. The eyes are often small, the nose is undeveloped, particularly at the bridge, which remains broad and sunken as it was in babyhood. The corners of the mouth are often puckered with cicatrices, representing old ulcers at the angles; other scars may mark the mucous membrane lining the cheeks, and the throat may exhibit the ravages of past ulceration. Such a child is apt to have constant chronic nasal and pharyngeal catarrh. With this physiognomy the syphilitic teeth are apt to be found, and marks of old iritis, choroiditis, or interstitial keratitis, and more or less deafness, are rather the rule than the exception.

FIG. 106.

Fig. 106 represents very fairly the syphilitic countenance, together with scars of ulcers, nodes, overgrown and irregular bones, and the general ungainly shape of a girl who has suffered severely from inherited syphilis.

**Syphilitic and Mercurial Teeth.**—Hutchinson, in his "Illustrations of Clinical Surgery," London, 1876, has described and figured, with copious illustrations, the effects of syphilis in modifying the shape of the central incisors of the upper jaw, as well as the changes in the teeth produced by the use of mercury during their forming stage. Mercurial teeth are very often found in the mouth along with syphilitic teeth, and the mercurial teeth were generally considered to be also syphilitic until Hutchinson clearly pointed out the distinction between them.

The true syphilitic "test teeth," as Hutchinson calls them, are the two central incisors in the upper jaw, the teeth of the permanent set. The milk teeth do not show this typical peculiarity of structure, and no other teeth can be relied upon to indicate the presence of hereditary syphilis, excepting the two above mentioned. The first set of teeth may be chalky, and fall into rapid caries; the second set may also be very defective, falling rapidly into caries, some of them stunted in growth, some of them placed crosswise or altogether out of place in the mouth; but none of these peculiarities are essentially syphilitic. On the other hand, a child may be markedly syphilitic by inheritance, and yet its teeth be perfectly sound.

FIG. 107.

The "test teeth" are found only in connection with inherited syphilis. The two central incisors are smaller than natural, and usually converge somewhat (Fig. 107), or diverge a little. The cutting border is narrower than the base of the tooth, making it peg-shaped, and along the lower edge uniformly indented with a single broad notch, as shown in the plate.

These single broad notches are the features of the teeth which stamp them as syphilitic. The serrations at the cutting border of the incisor teeth, produced by a number of shallow notches, mean nothing so far as syphilis is concerned. They are seen not infrequently upon all the incisors, of the lower jaw particularly. Irregular notches, even in the centre of the upper central permanent incisors, are not pathognomonic; and peg-shaped teeth, or teeth uneven in any respect, or badly placed or seamed or discolored, have no value as indicating antecedent syphilis. The "test teeth," as above described, are caused by syphilis, and are not caused by anything else so far as has yet been discovered.

Generally, when the edge of the notched tooth is thin, it chips off, and wears down with advancing life, and finally loses its characteristic appearance.

*Mercurial teeth* illustrate the effect of the excessive use of mercury—of mercurial stomatitis upon the permanent teeth. The teeth most plainly marked by mercurial stomatitis are the first (the anterior) molars. The incisors and the canine teeth suffer. The bicuspids escape. The mercurial tooth is deficient in enamel, covered with ridges and spines of exposed dentin, dirty-looking, and apt to become promptly carious. Quite often only the half of the tooth farthest removed from the gum is unhealthy, the half nearest the gum preserving its enamel in a smooth and reasonably white condition. The grinding surface of the molars is involved in the affection. Very naturally the influence of mercury is also

often shown upon the typical syphilitic teeth, but this is accidental, and by no means essential.

Hutchinson states that other forms of stomatitis may also produce this change upon the permanent teeth, but it is more marked and more common after mercurial stomatitis.

**Interstitial Keratitis.**—The cornea is frequently the seat of a chronic interstitial inflammation in cases of inherited syphilis. The affection is most common between the ages of six months and three years, most common of all during second dentition, but may be observed during adolescence. Occasionally it is encountered in acquired syphilis.

The affection comes on insidiously, with slight peripheral cloudiness of the cornea advancing toward its centre, attended by moderate photophobia and more or less of a pericorneal zone of subconjunctival hyperæmia. Sometimes the symptoms become quite intense. The cornea gradually grows quite white, and sight may become so reduced that only the difference between light and darkness can be perceived. The cornea may become soft and fluctuating in spots by diffuse infiltration of pus. Ulceration is uncommon, or very superficial if it occurs.

Gradually, as the malady gets well, the whiteness disappears from the periphery toward the centre, leaving sometimes clouded spots behind. The iris, the choroid, and the ciliary body may be involved in inflammation during the course of the disease.

Both eyes may be involved consecutively. The affection in each eye lasts from a few months to more than a year. Relapse is possible.

*Treatment.*—Hygiene and dietetics form an essential part of the treatment in these cases. Cod-liver oil, tonics, and change of air are of great service. Treatment by mercurial inunction is of the most value, or mild internal mercurial preparation may be used, due attention being paid to the digestion. The course must be persevered in persistently, with confidence of ultimate success in preserving vision, if the general health remains good.

Local treatment is of some assistance, but not so valuable as the general measures. Warm fomentations in the beginning of the affection are recommended, and instillations of a solution of atropine are of considerable advantage, especially in those cases in which the iris is threatened or involved in inflammation.

In inherited syphilis the ear suffers in two ways. There may arise, in a child with inherited syphilis, a catarrhal condition of the middle ear which is very obstinate, and likely to result in inflammatory adhesions of the ossicula and permanent impairment of hearing.

Internal mercurial treatment, with cod-liver oil, and plenty of suitable food, constitute the best measures to be employed against this affection, in combination with change of air, syringing of the external and inflation of the internal ear.

*Deaf-mutism* sometimes occurs in children with inherited syphilis who have been born with perfect capacity for hearing. Jonathan Hutchinson has called attention to a loss of hearing which may come on very suddenly, sometimes quite slowly, in children with inherited disease, after they have begun to talk, but before the age of puberty. This affection is apparently an essentially nervous malady, not attended by any pain. There is no evidence to prove that the lesion is inflammatory. Treatment is of little or no value in these cases, and their pathology is not understood.

### Treatment of Inherited Syphilis.

In the chapter upon the general treatment of syphilis, great stress was laid upon the fact that mercury was a natural antidote to syphilis, more or less useful in all its stages, most valuable in its power of keeping the disease in check, and very certainly possessed of ability gradually to eliminate the disease and retard relapses of symptoms. In tertiary forms of syphilis, however, mercury was accorded only a second rank among remedies, the preparations of iodine, notably the different iodides, taking the lead.

In inherited syphilis all the stages of the disease come together, as it were. The child is born already permeated through and through with syphilis, and possessing at the same time visceral and bony changes due to tertiary alterations of tissue and secondary phenomena, in the shape of excoriations, papules, pustules. The discharges from many of these lesions are essentially and actively contagious.

In inherited disease, notwithstanding these pathological facts, the iodides can usually be dispensed with, except when dealing with the late lesions of adolescence and bone lesions occurring during childhood. Commonly, all the good that can be obtained from treatment may be derived from a persistent use of mercury, not pushed to the extent of producing salivation.

Salivation is very difficult to produce in young infants. Excess of mercury given to them generally runs itself off by the bowels. Just before, and during the period of second dentition, especial care is necessary in the use of mercury, in order to avoid causing enough stomatitis to give rise to mercurial teeth.

Mercury is introduced into the circulation of syphilitic children preferably through the skin. The only obstacle to this is extensive ulceration of the surface (and even this does not preclude the possibility of dusting the skin with calomel), or the existence of so great an irritability of the integument, that the local use of mercury cannot be borne. This, however, is exceptionally uncommon. The advantage of administering mercury by the skin is that it spares the child's stomach for food. At no period of life is it so essential that the stomach should be unhindered in

the performance of its function as during babyhood. Another excellent reason for employing inunction upon babies is, that it is often impossible to say whether they get enough mercury if the stomach is relied upon, and valuable time may be lost in this uncertainty. Some babies vomit more or less after each feeding, and are constantly regurgitating between their repasts, and whether all of a powder or potion given internally stays down or not is sometimes a matter of great uncertainty.

If inunction is decided upon, twenty grains of mercurial ointment may be rubbed daily into a different part of the child's integument, the dose being regulated by the intensity of the symptoms and the age and vigor of the child. A better plan than this, although it is dirtier, is to spread upon the flannel belly-band of the child a thick patch of blue mercurial ointment, and bind it against the integument, removing it daily, and washing the skin well with warm water and soap.

If any eruption or mercurial erythema appears at the site of the mercurial application, a new spot should be selected, and the irritated skin washed with a delicate toilet soap and abundantly powdered, while a piece of old linen should be worn under the binder, between it and the impending mercurial eruption. While the belly is recovering, the legs, thighs, feet, and arms may be used for inunction or for the continued application of ointment upon bandages.

By this too much mercury can hardly be used. As soon as the snuffles, the eruptive lesions, and the restlessness of the child begin to mend perceptibly, the quantity of inunction or of the ointment bound upon the surface may be diminished; but the treatment must be kept up steadily in a mild way in some form or other, certainly as long as through the period of the second dentition.

If for any other reason it is deemed advisable to use mercury internally instead of by inunction, the gray powder, mercury with chalk, is a preparation sanctioned by long usage. This may be administered in powder, commencing with one-sixth to one-quarter of a grain two or three times a day, and working up the dose rapidly or slowly according to the intensity of the symptoms, until the latter show signs of yielding or the bowels are irritated by the drug.

In the latter case it is better to diminish the dose or to substitute inunction, or, in some cases, when a continuance of a large dose is very desirable, the bowels may be quieted by the internal use of mild doses of opium. This, however, will very rarely be called for.

A good way of producing a rapid effect of mercury upon a child is to dissolve a half grain of corrosive sublimate in six ounces of water, and to give a teaspoonful of this hourly for the first day, then every two hours, finally every three hours or at longer intervals, unless it obviously disagrees.

This watery solution has absolutely no taste. The child who will spit

out a powder will take this solution, believing it to be water. The medicine will mix with milk without turning it, or with any food in such a way that its presence is unsuspected; and if the whole or a portion of a given dose should be regurgitated by an infant, it is not a very serious matter, since the doses follow each other in such quick succession.

The average interval between the doses should be three to four hours for prolonged treatment, the intervals being shortened when a prompt or vigorous mercurial influence is desired. Mercurial stomatitis is not likely to occur with the use of this remedy in this way, and intestinal disturbance is equally uncommon—plenty of warning being given by premonitory symptoms before any explosion comes on, so that there is time to avert the latter.

Iodide of potassium may be administered through the milk of the mother, or in mild doses by the mouth of the infant, provided the dose be given with the food and be itself considerably diluted with water.

In no case should a child born of syphilitic parents, whether it shows evidences of inherited disease or not, be allowed to suckle a healthy wet-nurse. The risk of infecting the latter is too great to be overlooked. A syphilitic child may, however, suckle its mother with advantage, and can never infect her (Colles's law), even although she be considered healthy and has never shown any symptom of syphilis. The same rule applies to a wet-nurse. A syphilitic woman may have recovered and may secrete good milk, and such milk is perfectly suitable for the child, while the latter cannot poison the nurse.

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